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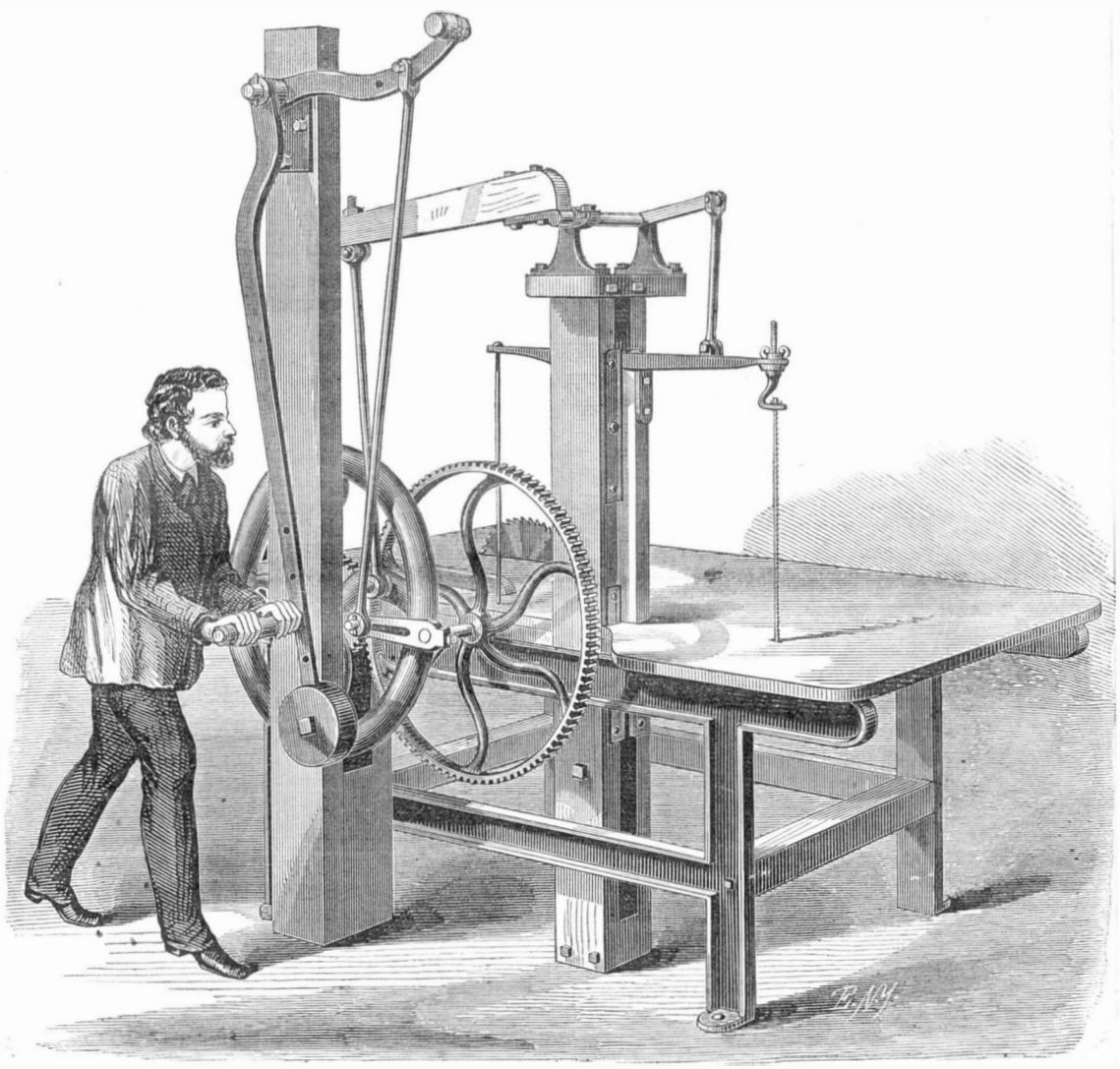
Improvement in Hand-power Sawing Machines.

In the science and the practice of mechanics there are well-known devices, which are employed as reservoirs of power, sometimes, however, mistaken by embryo mechanics, and by theoretical mechanics and amateurs, as producers rather than storers of power. Such are adjustable and automatically moving weights, the swing of the pendulum, the continued rotation of the balance wheel when once put in motion, and other similar devices. These contrivances for sustaining power have not unfrequently been considered reservoirs or producers of power *per se*, when the fact is well known that one cannot expect from any mechanical combination more ultimate and executive power than that imparted to the prime mover less the friction, etc. Still, there is a "balance of power" to be considered in mechanics as well as in politics, and he who so well divides the prime or first exerted power with the means of utilizing that power to the greatest advantage proves himself truly a mechanic. The machine shown in the accompanying engraving is a beautiful illustration of the adaptation of means to an end. It is a hand-sawing machine carrying a circular and a reciprocating or gig saw, which may both be run at the same time by the power of one man, or even of a boy, or either may be detached while the other is used. The power is applied, as seen, by means of a long pendulum lever swung back and forth, and having attached to its short arm at the top, a pitman connected at its other end with a wrist pin on a balanced gear. This gear meshes with a pinion on the saw arbor, which also carries a balance wheel intended to equalize the motion.



HASSENPFLUG'S HAND CIRCULAR AND RECIPROCATING SAW.

To the upright portion of the frame is pivoted a lever intended to drive the gig saw, the frame of which is similar to those in ordinary use, being two crossheads connected together by rods and braces, and moving in suitable slides in the upright. A bar extends longitudinally with the table from the upper crosshead, carrying at one end the gig saw and at the other a guide, passing through the table and guided by a box under the table bed. The connection between the reciprocating saw and the power is by means of a pitman, one end of which is pivoted to the lever before mentioned, and the other to a crank on the fly wheel.

These are the principal parts of the machine, which is very simple and not liable to become deranged. If only one man operates the machine where little power is required, as in running the gig saw alone, a treadle is attached to the saw frame on the lower crosshead by which the saw can be driven. A treadle can also be connected to the other end for driving the circular saw, its pitman being attached to the crank of the fly wheel. Either of these may be instantly unhooked, when two are at work, one propelling the saws by the pendulum lever, and the other guiding the stuff to be sawed. Or, one may work at the gig saw, and another at the circular saw by means of the treadles, each independent of the other.

The ease of running the machine, and the rapidity of its work are truly surprising. On a trial with a full-sized machine we ran both saws by means of the pendulum, with one hand, while two workmen drove both saws through hard seasoned elm planks four inches thick. We regard it as one of the most useful and valuable machines that have come under our notice. Patented June 11, 1867, by Henry Hassenpflug, assignor to himself and Edward Hassenpflug, Huntington, Pa. The machine is on exhibition at 94 Bowery, New York. Address Hassenpflug Brothers at this No., or at Bradford Place, Roxbury, Mass. See advertisement.

The Hoosac Tunnel.

We copy the following interesting account of a visit to the famous Hoosac Tunnel from the columns of the Hartford (Conn.) *Courant:*—

"The depot of the Troy and Greenfield railroad is three fourths of a mile from the east end of the tunnel. Here new and well finished six-horse coaches take the passengers over the mountain to North Adams, a delightful ride of nine miles, affording extensive and charming prospects. The drivers, coaches, and horses have been brought down from the White Mountain routes, where staging is as near perfect as it can be made, and the ride is as pleasant and romantic as many of the rides in that locality. It is claimed, that even with the nine miles of staging, better time can be made from Boston to the Hudson River than over the heavy grades and windings of the Western Road. Taking into consideration the romance of the mountain ride, the route will very likely become popular as it becomes better known.

"Those who are ambitious to thoroughly inspect the work at the tunnel, should stop over a day, and enter it at the eastern portal, first taking a look through the machine shops. On the east side, the mountain has been penetrated nearly one mile, though the enlargement of the tunnel to the full size necessary for the passage of trains is less than one half that distance. If one undertakes to walk into the mountain to the heading, he will have an ardent admiration of the perseverance and pluck necessary to accomplish the work which has already been done, before he has accomplished half the journey; but he will find no variety in the scenery to charm him. Solid rock was struck at the east side almost at the first blow, and the penetration of one mile has been through the toughest granite. The central shaft, from the top of the mountain, half way over, was sunk to a depth of 583 feet, when the terrible accident, last year, buried fourteen workmen in the shaft, and the deep cavern being filled with falling timbers and water, work was suspended. Machinery is now being put up to clear the shaft, when the work of sinking it to the tunnel level will be proceeded with. This shaft is elliptical, 27 by 15 feet in size, and is to be sunk to a depth of 1030 feet, when work upon the tunnel each way can be prosecuted from this point.

"The west shaft is the most interesting point to visit. From the west portal, a distance of about 700 feet has been completed, through quicksands, and 'demoralized rock,' and mountain springs, and the tunnel is of the required size, 24 feet wide and 10 feet high, large enough for a double track, and is arched with brick. At the west shaft, a half mile east of the portal, your correspondent found a collection of buildings containing engines, pumps, machinery; and everything in the surroundings showed the systematic progress of a great work. Entering one of the buildings, we looked down the shaft. Out of it came rushing a volume of steam, so that the eye could not penetrate through the misty atmosphere more than ten or fifteen feet. Up and down in this shaft go the laborers, hoisted or let down by alternate buckets or dummies, which also bring up the stone which is loosened by the glycerin blasts.

"It required some nerve to visit the depths below, the entrance to which looked like the opening of the doors of Hades, and as the thick steam rolled out, it was easy to imagine that it smelled of brimstone. Accepting the offer of rubber clothing, from hat to boots, and supplied with a well-trimmed lamp, your correspondent and an adventurous traveling companion prepared to descend. We called to mind the fact that men were constantly going into the depths, and returning safely, and putting confidence in a wire rope an inch in diameter, we jumped into the dripping, dirty, car, the signal was struck, and down, down, into the steaming dark abyss we were speedily plunged. The sensation, as one goes down, shut out from the light of the sun, and hearing the dull, heavy thud of the mammoth pumps, which throw out the accumulating water, is hard to describe. The mighty pulse of the mountain seems to be throbbing, and one listens, as if expecting some grand upheaving to punish man for his temerity in attempting to invade the realm of the inhabitants of the lower depths. Soon we touch bottom, and, alighting, trust to our feeble lights to explore the terrible darkness. Fifteen hundred feet away, into the bowels of the mountain, men are working with sledge and drill, each with a light; but we see them not through the inky darkness, and the sound of their steady strokes falls dead against the rocky ribs of the cavern long before it reaches us. We find ourselves surrounded by no fairy forms, and in no beautiful grotto, like the pictures in fairy tales; but in a rock-ribbed and arched cavern, where no sound of ordinary life reaches us. The air is fresh and good, being forced down from above through long pipes by powerful compressors, and the temperature is as grateful to the person on a hot August day as that of a refrigerator to a piece of melting butter. The exhibition of man's patient, persistent work, delving through fifteen hundred feet of rock to the eastward and over one thousand to the westward, excites one to poetical thoughts. But our poem on 'Pluck,' inspired in the cavernous depths, but never committed to paper, we wont ask you to print. We only advise a visit to the spot, where the working of the pneumatic drills into the rocky face, the patient blows of the sturdy miners, the systematic toil toward the accomplishment of this great enterprise, will excite thoughts which it is well worth a short exile from sunlight to experience. At all the working faces the toil goes on without cessation, night or day, except Sundays; and then the engineers take possession of the tunnel to accurately observe the progress and pursue the calculations which are, with unerring certainty, to bring the working forces together midway under the mountain. There are three gangs at each face, who work eight hours each; and it is calculated to put in and explode a glycerin blast during each eight hours, the drills penetrating the rock about three feet at each drilling. The workmen are Irish, French, and English; and their wages are $1 75 per day for ordinary laborers, and $2 25 for miners. Those who work regularly their eight hours daily in the tunnel are strong and healthy, but those who are in and out frequently, from the sun's heat to the earth's cold dampness, and *vice versa*, often suffer from rheumatism.

"From each end the tunnel is worked on an up grade of 26 feet to the mile, the grade to be continued to the point of meeting at the central shaft. When completed it is calculated that this shaft, 27 by 15 feet, will comprise a monster chimney, which will keep the air of the tunnel pure, and clear it quickly of the smoke of passing engines.

"Under the track is to be a central drain to draw off the accumulating water. Already a stream runs from the west-

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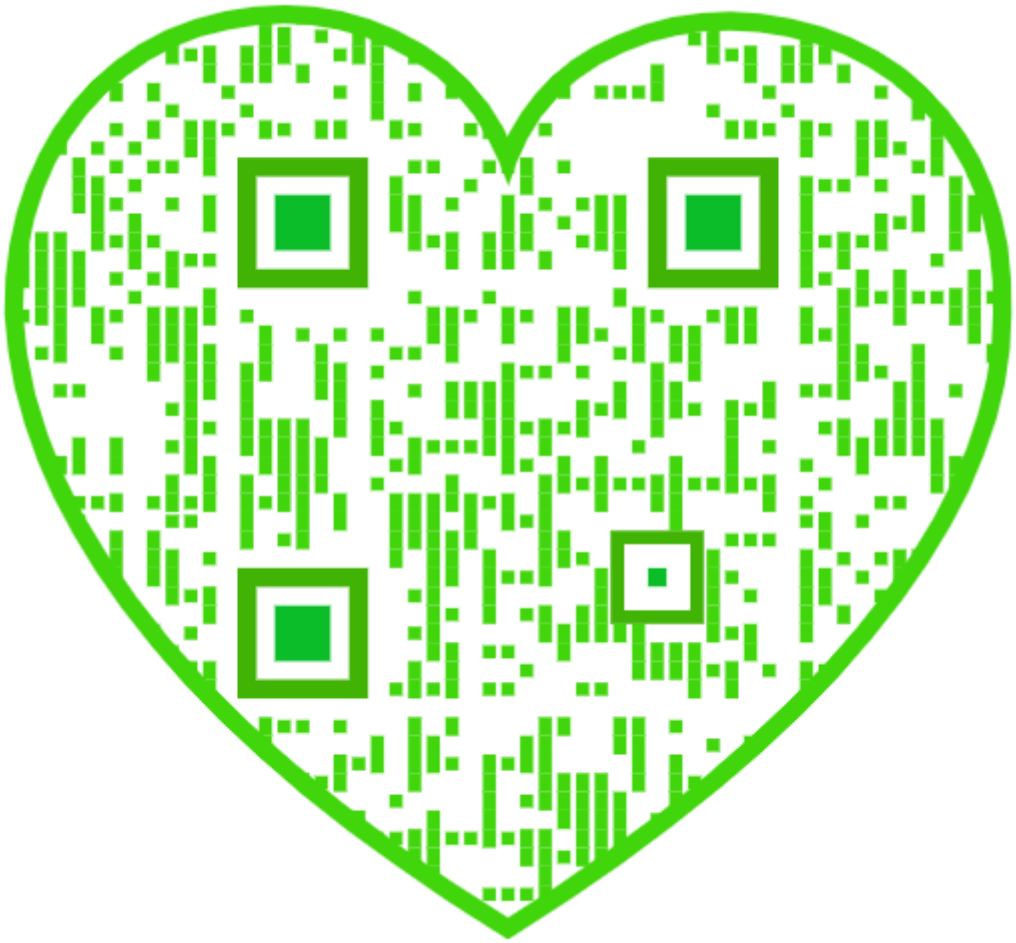

ern portal sufficient to make a good mill privilege. Some Yankee will utilize this power, no doubt, when the work is completed.

"Altogether, the mountain has been penetrated, at all the workings, about one and three fourths miles. The entire length of the tunnel being four and three fourths. there are yet three miles to penetrate. It will be too bad if the work is ever given up after so much has been accomplished. The trouble now seems to be in satisfactorily adjusting the contracts for completing the work with the $5,000,000 appropriation. The friends of the project very sensibly desire to divide the work into small contracts, and the Commissioners have advertised for proposals under this plan The opponents of the tunnel argue for one contractor, believing, no doubt, that no one man can be found who will take so large a risk, and be able to give satisfactory security for the completion of the work. They hope the $5,000,000 appropriation will fall by its own weight. But Massachusetts cannot afford to turn back from this great enterprise."

THE ORIGIN OF PETROLEUM.

Denton, in his popular lectures on Geology, entitled, "Our Planet, its Past and Future," after making some remarks upon ancient sources of rock-oil, etc., thus speaks of the original causes of these deposits:

"This is, then, no new thing; but whence comes it? And in answer to this question we have many theories, some of them sufficiently ludicrous. One suggests that, since the earth is a huge animal, the rocks its bones, the water circulation in them its blood, the grass and trees its hair, the hills pimples upon its face, and Ætna and Vesuvius eruptive boils, all that is necessary to obtain oil is to bore through the skin into the blubber of the monster, and oil very naturally flows from it. Another supposes, that, during the time of the flood, the great whales were buried deep under accumulations of mud, in those places where the oil most abounds; and hence petroleum is merely antediluvian whale oil. It has been suggested, that, since the earth is at some period to be destroyed by fire, the oil was probably prepared against that terrible day when the match will be applied, and the world burned up.

"Apart from these ludicrous explanations, however, men of science have considered this question, and rendered their verdict. Professor Silliman says that 'petroleum is uniformly regarded as a product of vegetable decomposition.' Professor Dana says, 'Petroleum is a bituminous liquid resulting from the decomposition of marine or land plants (mainly the latter), and perhaps, also, of some non-nitrogenous animal tissues.' By many, it is supposed to be a product of coal; and hence the name of 'coal oil,' so frequently applied to it. Some suppose that the coal, being subjected to the enormous pressure of the overlying beds, has yielded oil, as a linseed-cake does under an hydraulic press; and I have seen the theory advanced, that the coal, heated (as it evidently has been in the coal regions of Eastern Pennsylvania), gave off oily vapors which, rising to the cold region of the upper air, condensed, and subsequently fell in oily showers, making its way as best it could to the hollows of the earth's interior, where the oil-borer finds it to-day.

"Facts play sad havoc with these various theories. If the oil comes from coal, it seems strange that it is so rarely met with in a coal district. I have visited coal mines in England, Wales, Nova Scotia, Cape Breton, and not less than ten of the United States, but never saw petroleum in a coal mine, or even smelt it; and this is an article that never waits for an introduction, but salutes the olfactories at once. Of course, if this came from coal, coal mines would be the places in which to discover it; coal neighborhoods should abound with it, coal miners be familiar with it; and it should never be found in rocks older than the coal measures. The contrary of all this is true. When it is found in the coal measures, it has been forced up from underlying beds in which it was originally contained.

"In this country, nearly all the oil hitherto obtained has been from beds that lie below the coal measures, and sometimes at a great depth below them. On Oil Creek, in Pennsylvania, it is found by boring in shales and sandstones, sometimes to a depth of a thousand feet; these beds belonging to the Chemung group of the Devonian formation, and many hundred feet below the coal measures. At Enniskillen, in Canada West, where the oil has at one time come up in springs, and overflowed, leaving a thick bed of asphaltum covering the ground for an acre, the limestone in which borings are made contains characteristic fossils of the Hamilton group of the Devonian formation. The oil wells in Western Kentucky, and in some parts of Tennessee, are in the Trenton limestone,—that is, in the lower Silurian formation; and I have seen oil even at the base of this. The same oil floats on the surface of a limestone quarry near Chicago, the limestone belonging to the Niagara group of the Silurian formation; showing conclusively that it has no necessary connection with coal.

"But may it not have been produced from sea plants, as coal has been from land plants, as several eminent geologists have supposed? The quantity of free oil existing in the earth seems to forbid this. I saw a well in Western Virginia which produced twenty-eight thousand barrels in ten months. From three wells near Oil Creek, one thousand barrels spouted in twenty-four hours; and from one, three thousand seven hundred and forty. The 'Big Phillips' Well struck oil in October, 1861, at a depth of four hundred and eighty feet. It yielded about three thousand barrels a day. The oil rushed out with such violence, that the well could not be tubed for several days; and it has been calculated that forty thousand barrels of oil were lost in the creek before it could be collected.

"The 'Noble' Well struck oil in April, 1863. Its daily yield was about fifteen hundred barrels, at which rate it flowed for six months.

"There must be lakes of petroleum to render such flows possible. Where are the bodies of fucoids or sea weeds from which this oil could flow? The sea weeds of the Silurian and Devonian times (in whose beds the greatest quantity of petroleum is found) were so loose in structure, and contained so little bituminous matter, that their impressions do not even darken the light colored shales in which they are found embedded. Had these plants been as oily as fish, their bodies would have left dark impressions on the shales, as the bodies of fish do; and if they were not as oily as fish, or as bituminous as land plants, by what possibility could they produce lakes of oil? If the plants had, indeed, been oily, no oil could have been collected from them, unless preserved from contact with the air and water. Each plant being separated from its companions, on being buried in mud, the oil, supposing any to exist, would have been absorbed by it, and thus lost.

"Has the oil been distilled from bituminous shales, as some suppose? I think not. It requires a strong heat to distil oil from shales; and generally, where petroleum is found in the greatest abundance, there is the least appearance of igneous action.

"How was it produced, then? It is a *coral* oil, and not a *coal* oil. I have in my possession numerous specimens of fossil coral, obtained from Devonian and Silurian rocks belonging to the family of *favosites*, or honeycomb stone, as the name means the cells of which very much resemble those of the honeycomb; and, as the cells of the honeycomb are filled with honey, these cells are filled with oil. I have found oil in some specimens nearly as limpid as water; and, by heating the coral, oil runs out readily. I have seen these oil-bearing corals at Smokes Creek, where there are coral reefs full of it; in the Silurian limestones of Middle Tennessee; at Williamsville, near Buffalo; and in rocks near Penn Yan, in New York. In the State Collection of Fossils at Albany, and in the Montreal Geological Cabinet, there are numerous specimens. Professor Dana informs us, that it flows in drops from a fossil coral at Montmorenci, Can., and at Watertown, N. Y. It might be supposed that this oil filled the cavities of the corals, as it might any other cavity in the rocks; but I have found it repeatedly in these corals, and in no other part of the rock, invariably accompanying the corals, and never connected with any other fossil; these corals frequently in the center of solid limestone blocks. Reefs of such coral would furnish oil in quantities sufficient to account for the immense deposits that have been discovered. Preserved by them in compact bodies, the oil taking up at least half the space of the coral reef, we can readily suppose, that when the cells were crushed by the superincumbent weight of rock, or during upheavals and subsidences, cavities and crevices in the earth's interior would be filled by it.

"It is, then, an animal production, and not a vegetable one It is a product of the ocean, and not of the land; being almost invariably associated with salt water from the bottoms of seas that then covered a large portion of Western New York, Pennsylvania, Virginia, Eastern Ohio, Kentucky, and Tennessee. It is not formed from the bodies of the coral polyps, as some have supposed,—for, when dry, they are a mere film, that could be blown away by a child's breath,—but secreted from the impure waters, principally, though not exclusively, of the Devonian times; the coral polyps performing the same office for the water that the carboniferous plants did for the air."

ELECTRICAL NOVELTIES.

Electricity is a wizard's power. With it and little mechanical skill a man may turn his house into a magician's castle. The late ingenious Mr. Appold—of centrifugal pump notoriety—indeed, did this without it; his room doors opened as you approached them, and shut behind you; his stable gates did the same; upon touching a spring, the window shutters closed, and the gas was turned on; his apartments maintained themselves at a uniform temperature, and at a proper hygrometric state, by regulating thermometric and atmospheric damping apparatus; in short, his house was full or surprising devices, created and worked out by his wonderful inventive and executive skill. Had he pressed the subtle fluid into his service, there is no saying into what a palace of enchantment his dwelling would have been transformed But what he did not do has been done by the famous Robert Houdin, who has made electricity do the work of a retinue of servants and a watchman to boot, a full description of which will be found on page 178, Vol., XVIII Scientific American.

Such are a few of the domestic functions of the most ubiquitous slave that science has entrapped for man. Of its public services we need hardly speak; telegraphs have become too familiar to be longer regarded as curiosities, even those that send the message in fac simile of the hand in which it is written, or reproduce a drawing a hundred miles away. Electric lights, too, have ceased to be surprising, though they are far from having been used to their full powers. There have been difficulties in the way of getting a good and cheap source of electricity, which have barred the way to their extensive introduction; but some of these are removed and we may entertain better hopes for the future. One of the great doctrines, perhaps the greatest, of the present era of science, is that of the convertibility of forces one into another. Heat is turned into mechanical force, and mechanical force is turned into electricity, and *vice versa;* and heat and electricity are similarly interconverted. A celebrated London photographer has erected a magneto-electric machine for conducting some of his operations which require an intensely bright illumination, and has thus apparently become independent of the sun; in reality, he is using the solar rays which came to our planet thousands of years ago, for what is coal but "bottled sunshine?" A Birmingham electro-plating firm also set up a similar machine for depositing their precious metals, and a sugar refinery another for generating ozone to bleach sugar. But the principal use of such an apparatus is for lighthouse illumination. A French company bought the patent for France to this end, and the light was to be tried at Cape Grisnez. It was not only to illuminate the Channel "a giorno," but to shed a mild twilight over our own southern counties. We have not heard of the trial—perhaps it has yet to come off.

From lighthouses, the transition to buoys and beacons is easy. These an ingenious inventor has proposed to illuminate by electricity. Those who attend scientific lectures, or look into instrument-makers' shops, will have come to know something of coils called "induction coils," for producing in effect a very powerful current of electricity from a very weak one, and of certain glass tubes and globes for exhibiting the passage of the electric spark through a partial vacuum. Well, the inventor aforesaid proposes to place a battery and a coil in the hollow body of a buoy, and to lead the current to one or more of these vacuum tubes inclosed in a lantern on the top. A steady light, glimmering like a glow-worm on the sea, would thus be secured, and neither wind nor wave could readily extinguish it. Some one else invented a lamp for miners on the same principle: a knapsack was to hold the battery and coil, and wires were to lead to a lamp composed of a vacuum tube carried in the hand. There could be no doubt of the safety of this light—in this respect it would rival the immortal Davy's invention; but portability is a rather necessary feature in any tool a pitman has to use, and the knapsack and entangling wires might prove rather worse than an inconvenience to him, especially when, as happens occasionally, he has to pick and wriggle his way, worm fashion, through a one foot seam.

Perhaps, after all, the most curious application of the electric light was that attempted lately at one of the Paris theaters. The actors were decked with glittering crowns, and, to add to their brilliancy, they were so made that a chaplet of electric sparks encircled the wearer's head; the necessary current being supplied and led to the coronet from a concealed battery. But the "sensation," pleasing enough doubtless to spectators, painfully verified the truth of the Shakespearian maxim touching the uneasiness of the head that wears a crown, for one of the performers was grievously injured by the passage of the current through his or her head, instead of through the star-spangled ornament Not quite so striking, but still curious, are the electrical jewels made by MM. Trouvé and Cadet-Picard. These consist chiefly of scarf pins and brooches, representing heads of men and animals, which roll their eyes and work their jaws. Some are in the shape of tiny soldiers which beat drums, rabbits that play on tambors, and birds that flap their wings and fan their tails. They are worked by tiny electro-magnets concealed within them, and connected by fine wires with little batteries carried in the pocket or elsewhere about the dress. Fashionable Paris was charmed with these trifles for a season; doubtless they are forgotten by this time. Electricity is an agent peculiarly suited to French ideas, and has been turned to more droll uses by that people than by all the rest of the nations of the world put together. When rifles were the talk of the governments of Europe a few months ago, the emperor was shown one to be fired by electricity; the stock of the gun enclosed a battery, from whence wires passed to the breech and into connection with a platinum wire passing through the cartridge. The pull of the trigger closed the electric circuit, and in an instant the platinum wire became red hot and ignited the powder. The cartridge carried no fulminate, so it was a very safe one. The emperor, it was said, greatly admired the gun; he preferred to adopt the Chassepot, however.

From killing to curing. While one man is using his ingenuity to throw bullets into his fellow man, another is devising schemes to take them out. Probing the body for these missiles is a tedious and painful operation, and its difficulty chiefly lies in discovering the bullet amongst the fragments of shattered bone by which it may be surrounded.

Electricity affords the means of doing this. The probe is made with two points, from each of which a wire passes; and in the circuit is placed a battery and a signal bell. So long as the two points are not metallically connected, no current passes and the bell is silent; but, when they are joined by any piece of metal, it rings. When, then, the surgeon thrusts the probe against bone or muscle, there is no effect, but when the points come against the metal bullet, the bell announces the fact: the forceps for extracting the lead behave in the same manner. That electricity exercises an exciting influence over sluggish nerves is a fact insisted upon by medical galvanists, but it likewise appears to possess a deadening power over such as are excited, for a dentist in Bordeaux has applied it to dull the pain of tooth extraction. Report has spoken well of the application, but details of the *modus operandi* are wanting. For this one painful operation, at all events, chloroform has possibly been superseded by electricity; but the latter has joined issue with the former in another way, for two French electricians have very recently announced, as the result of experiments tried upon animals, that a powerful shock or strong galvanic current will restore animation in cases of over-stupefaction by the sedative.

These actions are inscrutable enough, but some recently announced influences of the fluid upon vegetable organisms are more puzzling still. In the beginning of the century a learned Abbé wrote a treatise on the applicability of atmos-

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pheric electricity to the curing of diseases in plants, and encouraging their development, and he described his means of drawing currents from the clouds and air and distributing them among his cabbages and lettuces. Very surprising effects were produced, but little notice seems to have been taken of them; probably, because there is a natural tendency to ignore phenomena of the rationale of which no clear ideas can be formed. But quite recently M. Blondeau brought before the French Academy of Sciences the results of some experiments quite as startling as those of the worthy Abbé. He says that the current ripens fruits; of this he has assured himself by electrifying some apples, pears, and peaches, all of which ripened under the influence of the fluid, whilst the other fruit on the same trees remained far from ripe. Then he electrified seeds and grains, by steeping them in water and submitting them to the action of a powerful current. Peas, beans, and wheat, were so treated and sown in good soil. By the side of them were sown similar seeds not electrified. The former sprouted sooner than the latter; the development of the young plants was more rapid, and the stems and leaves were more vigorous than those not subjected to electrical influence. But, most mysterious of all, some beans that had been electrified grew upside down, with the roots in the air and the cotyledons in the soil.

For the mechanical and engineering arts, electricity has done much already; but it promises to do more. We have had an electric loom to dispense with the complications of the Jacquard cards, and some of our great iron-clads have been furnished with electrical call-boys for enabling the captain on the bridge to communicate his orders to the engineer below, and to the steersman at the wheel. Now, the engineer has the prospect of relief from his bugbear—boiler incrustation. It is asserted that the placing of a bundle of metallic spikes in the path of the steam as it issues from a boiler, has the effect of generating a stream of electricity, and that if this be led to the metal of the boiler, it sets up an action at the surface which prevents the deposit of saline matter. The question is a disputed one at present.

The phenomenon is unexplained, and therefore, in some quarters, discredited; and as yet, sufficiently crucial tests have not been applied to settle it indisputably as a matter of fact. So we pass on to another, and perhaps better established, application of the twin elements, electricity and magnetism. We allude to their use in the manufacturing and testing of iron. This metal, in its crude state, is full of impurities, such as carbon, sulphur, phosphorus, and silicious bodies. These are electro-negative in relation to iron, which is electro-positive. When, then, a powerful current is directed through the fluid metal in the melting furnace, the foreign matters are expelled with some boiling and commotion, and a very pure metal is produced and drawn off to the casting molds. This method of purification has been tested at Sheffield with remarkable success, and it foreshadows improvements in the manufacture of iron second only to those that have followed from the revolution effected by Bessemer in the making of steel. The author of the process in its present form is Mr. Robinson, of London; but a somewhat similar plan was suggested and tried five-and-twenty years ago, to the proof of the adage that there is nothing new, "except," as cynics say, "that which has been forgotten and re-discovered." The testing of iron castings and forgings by magnetism is an ingenious idea, the credit of which belongs to Mr. Saxby, R. N., one of our dockyard naval instructors. When a bar of iron is placed at a certain inclination to the vertical, it becomes temporarily a magnet, and behaves as such to a compass needle brought into its vicinity. If the bar be perfectly sound, free from cracks or cavities, the compass needle, when passed around it, goes through methodical evolutions, always directing its north point to particular regions of the bar, and otherwise behaving in an orderly manner. But if the iron be cracked or flawed internally, there will be breaks in the continuity of its magnetism corresponding with the mechanical interruptions, and these the compass needle will point out by behaving vagariously when it passes over them. This is the principle of Mr. Saxby's tests; he has tried them practically at the Chatham and Sheerness dockyards, and with a success that gives great hopes of removing one of the greatest difficulties engineers have to cope with.

We have known an instance in which a large and valuable forging, the paddle shaft of one of our great steamships, was discovered to be defective only when, after weeks of labor, a cutting tool revealed the hitherto invisible flaw. The loss involved amounted to several thousand pounds, of which a part at least, might have been spared had some effective means been known for testing the soundness of the mass of metal.

The latest novelty is an electric organ. One of the most important and valuable properties of the galvanic current is that of transmitting power without motion. If we want to ring a bell at a distance, we must move the whole length of an intervening wire, and this motion takes strength and time. Similarly, to open the valve of an organ pipe by touching a clavier requires the intervention of complicated rods and levers Strength is necessary to press down the key to work these levers, and time to communicate the motion to the pipe's orifice. Electricity requires neither; it instantly transmits force enough to open the valves without demanding more than a gentle pressure upon the clavier. Another advantage is, that the keyboards may be at any distance from the organ pipes. We heard this application suggested long ago; the credit of working it out now belongs to an English organ builder residing in Paris, who has made several instruments on the plan. One has already been erected at the Crystal Palace. Blown by steam—played by electricity—what is the king of instruments coming to?—*English paper.*

THE INFLUENCE OF SCIENTIFIC CONVENTIONS.

Prof. S. D. Tillman, in his address at the Autumnal Opening of the Polytechnic, on Thursday, the 10th inst., after alluding to the success of the late Scientific Congress at Chicago, said: "Nothing more was needed to confirm the general opinion as to the benefits arising from these annual gatherings. They accomplish for science what conventions do for religious, political, and commercial objects, by securing unity of purpose, concentrated effort, and expeditious action. Indeed, they do much more in dispelling illusions, which are often palmed off as truth among those who are only captivated by novelty. While discovery is constantly extending her domain, opening new paths of progress, and erecting new beacons, to direct those who are to follow, it is the special duty of advanced men to see that no false lights are shown which would lead to the propagation of unsound doctrine. Every new hypothesis or induction should be subjected to the keenest scrutiny of those who are competent to pass upon its merits. A scientist, who reads a paper before his peers, reaches at once the appreciative audience he most desires. If he describes new experiments, they, more than all others, are interested in the results; if he advances new views, they are ever ready to question the correctness of his conclusions. Thus, it frequently happens, that the discussion immediately following the reading of a paper, will dispose of objections, and establish positions which could not be reached in a long time through the medium of printed dissertations. Moreover, the suggestions often thrown out during the free exchange of ideas in a verbal debate, are of great service in exciting that enthusiasm in the votary of science which prompts him to higher efforts in the pursuit of truth.

"The beneficial influence of these scientific associations is not so obvious here as in Europe, where they are older and more firmly established. Of late, the British Association for the Advancement of Science has accomplished much; yet it will be remembered that, even after its formation, Sir John F. W. Herschel, in a note appended to his able treatise 'On Sound,' in the *Encyclopædia Metropolitana*, acknowledged his indebtedness to foreign journals for a portion of the information he then presented and expressed his regret that so little attention was paid in his own country to what was being done by scientific men abroad. 'Here,' said he, 'whole branches of continental discovery are unstudied, and indeed almost unknown, even by name. It is in vain to conceal the melancholy truth. We are fast dropping behind. In mathematics we have long since drawn the rein, and given over a hopeless race. In chemistry the case is not much better.' These, and other words of regret and reproof then written, doubtless hastened the great and favorable change which has since taken place in his country. Certain it is, that the formation of the British Association has led to the happiest results; for to-day it may boast of many distinguished names in almost every branch of science.

"If there is any hindrance at present to the progress of truth, both here and abroad, it arises chiefly from the spirit of exclusiveness sometimes evinced by those who have devoted their lives to the study of physical laws. This should not excite surprise, because the tendency of abstract science is essentially aristocratic. The man who knows, stands on a higher plane than the one who does not know. Hence, the position of the scientist is impregnable. He has riches and power, of which he cannot be robbed. Should he find his chief enjoyment, however, in the reputation he has acquired, he may well fear rivalry. On the other hand, if he pursued truth for the love of it, he will welcome all who labor in the same spirit, and extend to those below him a helping hand.

"The study of natural laws, in the abstract, undoubtedly affords pure enjoyment; yet this feeling is vastly intensified by witnessing their successful application for the accomplishment of new and important results in the useful arts. Such results are often brought about by the artisan who, although he may know but few of these laws, understands most thoroughly all the conditions peculiar to his art, under which they can be effectually applied. Our great inventors have not, generally, had the advantage of a liberal education By ingenuity alone they take the lead, and, of course, counteract to a certain extent the haughtiness sometimes engendered by learning.

"Scientific associations will be entirely successful when they fully recognize the fact that Science in these modern times has a double mission. From serene hights she beckons on the student who longs for clearer views of the divine plan of the universe; yet often she descends to the humblest abodes of men, and watches while Invention weaves some new device. Thus, we find her potent influence in those improvements which lessen manual labor, supply corporal wants, and add to the material resources of our race. We, of the Polytechnic, welcome her in both offices, as revealer of long hidden links in the endless chain of sequences, and as prompter to new combinations of some of those links by which the surplus powers of nature are successfully applied to ingenious mechanism, and by which even new forces are generated, and made obedient to the will of man."

An Alarm.

We have in our house a little invention which we have several times noticed in other dwellings, but having no direct interest in its operation we have not paid much attention to its working. It is a little thing, and stands upon a little shelf in our sleeping room; but in an emergency it is capable of making a good deal of noise, and imparting useful information. It is an electric alarm, with wires entirely concealed from the eye, and which run from it to the doors and windows and scuttle of the house; and should any of these be disturbed, the alarm is at once sounded. By means of a "tell-tale" it can be ascertained at once in what part of the house to look for the disturbance.

The other night, before retiring to bed, we had the assurance of the servant that everything was close and secure. We set the alarm, but instantly it set to ringing, and we knew that something was wrong, and upon examining the "tell-tale, we found out where to look for the cause. The laundry window was dropped about an inch, and the little machine would not keep still until the matter was made right.

By the use of this little apparatus, thousands of dollars worth of property have been saved from burglars.

The Geysers of California.

A correspondent of the New York *Journal of Commerce*, writing from Sonora county, California, thus describes the Geysers of that state: After ranging through a considerable part of the State of California, seeing that which is most grand and beautiful, I am constrained to tarry here and in common with travelers who have peeked into the crater of Vesuvius and witnessed other strange spectacles in the Old World, to declare that the most strange and wonderful of all has been reserved for the last, when we gaze upon the extraordinary phenomena known as "The Geysers." Few objects in nature are more deserving of attention from those who delight in scientific investigation or desire to merely to gratify a love for the marvelous.

A deep serpentine canon or ravine about a quarter of a mile in length is flanked by walls of denuded rock, precipitous and rugged, full one hundred feet in hight, and through their entire extent strong jets of sulphurous vapor spring from every crevice, while along the base streams of water hot, hissing, gurgling, contribute to swell the volume of the torrent that sweeps down into the valley of the Russian river, its course marked by clouds of steam. The substances held in solution by these waters coat every boulder with mineral incrustations, and above the water line the disintegrating rocks bristle with crystalline sprays of sulphur, borax, alum, etc. Indeed that must be a desperate case which could not be cured by medicines found in that great laboratory; if no cure be effected, they would certainly do the other thing. Yellow, green, and gray colors predominate, with a large admixture of oxide of iron. The place where you thread is almost too hot for endurance. If you sit awhile to contemplate the extraordinary scene a sensation of discomfort suggests an immediate change of base. If a longer stay prove admissible, the probability is that clothing thus brought in contact with strong alkalies and acids would quickly be destroyed. This singular gorge is therefore not inappropriately named "Devil's Canon." In fact every object here is suggestive of something Satanic. The visitor is shown "The Witch's Cauldron," "The Devil's Smoke Pipe," "The Devil's Tea Kettle," etc. The roar of boiling water and the rush of steam commingle, rendering the human voice inaudible, except at short distances. The one is deep, profound, sepulchral, suggestive of spectral shapes, with horns and other diabolical appendages. The other is sprightly babbling, as if in mockery. A cane thrust into the yielding embankment is withdrawn, smeared through its entire length with a sticky pigment representing colors of every hue. Large masses are readily detached, rolling to the bottom, where they dissolve and float away. Seventeen varieties of mineral substances have been found here. In truth, if the contents of a huge drug store were multiplied one hundred times, then mixed promiscuously, and the whole villainous compound thrown into a chasm heated by subterranean fires the product might bear a faint comparison with the geysers of Sonora county. In one place a pool of water, black as Erebus, and about ten feet in diameter, is seen boiling furiously. To fall in would be instant death. Elsewhere the stream escapes from fissures in the rock with a power sufficient to hurl stones from the opening with great violence.

These phenomena have been variously explained, some ascribing their origin to a volcanic agency, as scoria and lava are found plentifully. Others suggest that the mixture of acids, and alkalies taking place causes a combustion, the effects of which are apparent. The last theory advanced receives support from the fact, that the geysers manifest much greater activity after a season of heavy rain; erudite professors must settle this question.

More Vandalism.

One of the peculiar faculties of the late Prof Faraday consisted in his great mechanical ingenuity and constructiveness, as evidenced in the apparatus for conducting the original and elaborate experiments by which he arrived at such great results. Their main character was simplicity, which is indeed the perfection of ingenuity, and the distinguishing feature of the work of genius. As has lately been remarked by a good judge, "the practical powers were never perhaps more strikingly displayed by man than in the various contrivances he adopted while conducting his researches—some of them being almost equivalent in ingenuity to the compilation of a steam engine." We regret to have to record the fate of the greater portion of these contrivances. Shortly after Mr. Faraday's death they were given by his wife to the porter of the Royal Institution, who, we need not say, could scarcely appreciate them. He accordingly sold them piecemeal, and even parts of the same apparatus to different buyers, thus breaking up combinations that probably were understood by few except their gifted inventor Thus it is probable that all this splendid collection is destined to be scattered and distributed among those to whom their only value will be as souvenirs of departed greatness.

A CURIOUS accident recently happened at Almond, Mich. The jack wheel of a threshing machine burst and killed Albert Tucker, who was in charge of the machine.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Adhesion, Cohesion, Gravitation.

Messrs. Editors:—Natural philosophers make three divisions of the attraction of matter for matter, viz., adhesion, cohesion, and gravitation. If we seek for the basis of this classification, we find that it is merely the intensity of the attraction; that is, between adhesion, cohesion, and gravitation, there is only a difference in degree and not in kind. Ought we to admit that there are three "kinds" of attraction manifest in bulky matter, when we observe nothing more than the clinging of atoms together with unequal degrees of force? To do so is to violate that demand for simplicity everywhere made by science.

These different attractions depend on the proximity of the ultimate particles. Common facts prove this. Suspend two plates of glass near each other by long cords. They approach each other, illustrating gravitation. Bring their particles nearer together by pressing one upon the other and adhesion is manifest. How that a still closer approximation of atoms produces cohesion, may be thus shown. Break one of the plates in such a manner that cracks will radiate from a center, and spring apart the pieces of glass on each side of one of these cracks. The crack will be seen to advance a short space, but upon the pressure ceasing it will entirely disappear for the space it had advanced. No air or dust having entered, the particles were free to come very close together and thus to cohere. Where the glass was plainly broken for about an inch, it is now entire. This theory of the "kinds" of attraction depending on the distance between particles reduces all to one power or force, the peculiar energy of the atom, the basis of the correlation and conservation of force as taught by Faraday, Grove, and others, the energy more beautifully and definitely exhibited in the various forms of chemical attraction.

F. T. Glover.

Providence Conf. Seminary, R. I.

[Our correspondent is mistaken in his premises as well as his conclusions. The distinctions which exist between the different kinds of attraction are marked. The attraction of gravitation acts upon bodies or particles of matter, however far they may be separated. The attractions of cohesion and adhesion act only at insensible distances. That there is a difference in kind as well as degree will also be manifest, when the distinction between adhesion and cohesion (evidently not comprehended by our correspondent) is considered. Cohesion only exists between particles of the same kind, adhesion only between particles of different kinds of matter, and does not exist at all in many instances. Mercury and glass are two bodies which are attracted toward each other, when distant from each other, by the universal law of gravitation, when brought near to each other they will not adhere in the slightest degree. Gaseous bodies also obey the law of gravitation but they are destitute of cohesion. The distinctions made between the different kinds of attraction were probably not made so hastily as the opinions of our correspondent, and were probably based upon a more complete knowledge of physical phenomena than he has yet obtained.—Eds.

The Velocipede Mania—An Improvement Wanted.

Messrs. Editors:—I would beg to call your attention to a large field for American inventors, and if your journal would give my ideas a notice it would probably render a service. All France is crazy on the subject of velocipedes, and clubs are forming in every town and city. Velocipede races are more of an every day occurrence than horse races, and the manufacturers cannot supply half the demand. Those sold here are of two descriptions. In the one, the person is seated in a kind of chair, and works two pedals by the feet, and a lever with the right hand. The other and favorite description consists of two wheels, coupled together by an iron brace which serves for a seat. The forward wheel has projections for the feet, and the motion is obtained by a rolling movement of the leg. These last are tiresome, require some practice to learn, and a very nice balance not to fall over.

What is wanted is a system more simple, which one can learn at the first lesson; less fatiguing, and an equilibrium which will permit the velocipede to stand alone. For a patent in France that would conserve these requirements, I would give $2,000 in gold. If you think it worth while to notice this in your paper you would oblige me.

C. R. G.

Paris, Aug. 31, 1868.

[The above comes from a responsible American gentleman, now carrying on an active business in Paris.—Eds.

Sun Power, Etc.

Messrs. Editors:—In No. 11, current volume of the Scientific American, your correspondent "A" presents the idea of raising a vast weight up an incline (why not a perpendicular in level countries?) utilizing the expansion of metals by sun heat, and obtaining a small though irresistible motion of the mass on each successive day. Now I would suggest an endless chain with buckets of any required size to contain water (sand?); self-filling at the bottom, self-discharging at the top, thus "concentrating" the power in a reservoir for "transportation" through pipes to any point, for use, there to be transmitted to machinery through turbines. I suggest that the metal bars constitute the framework of the endless chain and supports, to have a mutual action and reaction upon each other, whereby the contractile as well as the expansive forces be utilized, and these forces, being equal, double the motion obtained. (Any good mechanic can supply details of construction). I suggest lenses, co-longitudinal with the bars to increase the heat if found expedient in practice. I suggest an automatic arrangement for multiplying the number of reciprocatory movements of the bars of force from one per day—as "A" has it—to any economical number desired, depending on the weather. This, by a self-acting shade to cut off the sun's rays when expansion maximates, and again expose to the sun when contraction maximates, thus obtaining as many motions per day as "A" would per season. By this plan there would be no trouble about gearing up or down to convert power into speed or lose it by friction of such gearing. I hope "A" can offer a better plan than the above, and if he does, then I also have one or two more left for his consideration.

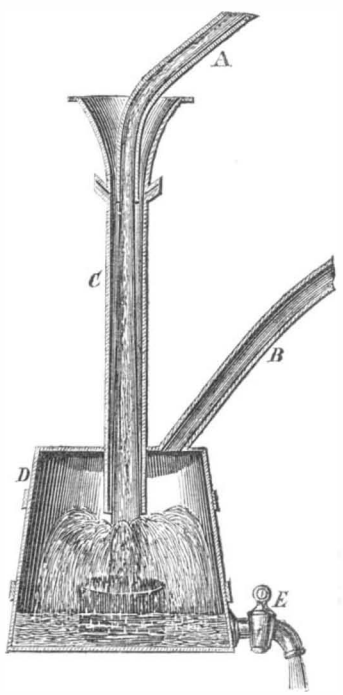
W. L. D.

Concentration, Transmission, and Transportation of Motive Power.

Messrs. Editors:—In my former communication, published on page 163, current volume of the Scientific American, I remarked in substance, that it seemed strange that such an obvious source of power as solar heat should not have been heretofore made directly applicable to mechanical work. In your issue of 16th September, you publish a very interesting letter from the pen of C. H. Delamater, giving a statement of the progress which has been made by Capt. Ericsson, in his experiments with solar heat as a motor. Your correspondent states that I am mistaken in supposing due attention has not been paid to this subject. While I might call attention to the fact that very many periodicals devoted to mechanical engineering, as well as the transactions of learned societies, of which I have for years been a constant reader, contain, if anything at all, the most meager and general allusions to the direct mechanical application of this great source of power, it seems to me that the very fact that in this mechanical age no successful application of it has yet been made (if we except Capt. Ericsson's invention), is a sufficient evidence that due attention has not been paid to such an obvious and infinite power as solar heat.

I am delighted to hear of the success realized by Capt. Ericsson. While I was aware that some discussion in regard to this subject had lately taken place in France, as well as in other parts of Europe, I had not learned the progress that celebrated engineer had made until it was first published in this country, through the communication of Mr. Delamater to your valuable journal. I am glad that my letter called out that interesting correspondence although it has in a measure forestalled what I intended to have suggested in this letter. I have no claims to make as to originality in what I shall say, or what I have said about solar heat. Further on I shall suggest what I think is a new application of a very old device, yet I am not sure that even that has not been thought of. I wish it distinctly understood that I have no ambition to gratify in these letters, they being written in the desire to call the attention of other and abler engineers than myself, to the supply of what seems to me to be imperatively demanded at this time in order to meet coming exigencies.

In my former letter I called attention to the fact that the distribution of power highly concentrated was the chief difficulty in making a direct application of solar heat to moving machinery. At the risk of being suspected of borrowing an



idea from Mr. Delamater's letter, I will state that it was my intention to have suggested in my present letter the concentration of the solar heat itself, but he has spared me the necessity of saying much upon that point. The correctness of my own views is sustained by his account of the views and success of one of the greatest engineers of the age. I will therefore pass on to the discussion of the transmission and transportation of motive power. Both the transmission and transportation of motive power have, to a limited extent, been generally practiced for many years. The steam engine is an example of the former, the motive power being transmitted through pipes from the boiler to the cylinder, while the common soda water fountain is an example of the transportation of power, i. e., compressed gas. More extended applications of the method have been attempted, the objects being the propulsion of horse cars, etc.; but the results of all such attempts have, I think, convinced most engineers that anything like a general application of it to the driving of machinery is utterly out of the question. Not so with regard to transmission; and here I again find myself somewhat forestalled by your article, published on page 196, entitled "Transmission of Hydraulic Power, etc.," containing the suggestions of M. Leloup. I am confident that no engineer will read that article without being convinced that there is enough promise in this subject to repay investigation and experiment, although he may possibly object in some particulars, to the details of the apparatus proposed to effect the desired object. I am confident that no such complicated arrangement as that of M. Leloup would be necessary in most cases, and often a water wheel might even be dispensed with. On page 477 of "Ewbank's Hydraulics," is a description of an ancient machine called the *trombe*, or water bellows. I give herewith a drawing of one of these machines. The pipe, A, discharges water from the reservoir into the trumpet-shaped mouth of the vertical pipe, C. The end of the pipe, A, terminates in the pipe, C, at the bottom of the trumpet-shaped mouth. Opposite the lower end of A, are made a number of openings in the pipe, C, having short inclined tubes projecting from them, two of which are shown in the drawing. The lower end of C, enters the close vessel, D, and discharges its contents on a stone placed directly under it. As the water from A passes down into C, it draws air along with it through the top of the funnel, and also through the holes in the upper part of C. As the liquid dashes against the stone, the air separates and rises to the top of the vessel, whence it is forced under pressure through B, while the water accumulated at the bottom is drawn off by the regulating cock, E. This instrument, even in the rude form here presented, is capable of performing a good deal of work, and I feel sure that it can be improved so as to vastly increase its efficiency. A series of trombes might be made to supply compressed air from the falls of Niagara, through a system of pipes, at less cost than the gas works of that city, which would supply motive power for all its engines, elevators in warehouses, printing presses, etc. The cities of Troy and Albany might be supplied during a great portion of the year from Cohoes Falls. In many places it might be necessary to adopt some device like that suggested by M. Leloup, but where the trombe can be applied, it is doubtless the very simplest of all devices for obtaining a supply of compressed air.

With all the engineering and inventive talent possessed by the United States, I believe the honor of making initiatory experiments in this field should not be left to other lands, and and whether or not the suggestions I have made shall prove to be of any direct value, if they awaken thought upon this important subject among your mechanical readers they will not be altogether worthless.

A.

Index Plates for Gear Cutting.

Messrs. Editors:—We have noticed the communications of your correspondent E. H. H. respecting index plates for gear-cutting machines, and herewith give the numbers for two sizes which we have been in the habit of using, thinking it would interest some of your readers. In a plate 24 inches in diameter we drill the following circles:

126	158	188	220
128	160	190	222
130	162	192	224
132	164	194	226
134	166	196	228
136	168	198	230
138	170	200	232
140	172	202	234
142	174	204	236
144	176	206	238
146	178	208	240
148	180	210	242
150	182	212	244
152	184	214	246
154	186	216	248
156		218	250

Number of circles, 63; number of holes, 11,844. Will divide all numbers to 125, and all even numbers to 250, or 187 different numbers. Diameter of inside circle, 7 inches. Distance from center to center of holes in inside circle, 0.175 inch; do. in outside circle, ·301 inch; do. between circles, ·135 inch.

The 28-inch plate has the following circles:

152	182	212	242	272
154	184	214	244	274
156	186	216	246	276
158	188	218	248	278
160	190	220	250	280
162	192	222	252	282
164	194	224	254	284
166	196	226	256	286
168	198	228	258	288
170	200	230	260	290
172	202	232	262	292
174	204	234	264	294
176	206	236	266	296
178	208	238	268	298
180	210	240	270	300

Number of circles, 75; number of holes, 16,950. Will divide all numbers to 150, and all even numbers to 300, or 224 different numbers. Diameter of inside circle, 7 76 inches. Distance from center of holes in inside circle, ·160 inch; outside circle, ·293 inch; between circles, ·135 inch.

Brown & Sharpe Manufacturing Company.

Providence, R. I.

Poison of the Locust.

Messrs. Editors:—An article in the Scientific American of Aug. 26, copied from the *Medical and Surgical Reporter* in relation to the poison of the locust, calls to my mind some observations made during their visit to this section in June last.

The locust said to be poisonous is not the insect resembling the grasshopper, but the red-eyed cicada, popularly known as the "Seventeen Years' Locust," and is different from that other member of the cicadæ family frequently called locust, but which are common among us every year.

The eggs of the red-eyed cicada are injurious to vegetation, and trees are frequently seen with their tops dead from the eggs deposited by locusts in the bark of the upper tender branches. The sting, so called, is the incision made by the ovipositor of the insect, in which incision, generally in the bark of trees, the eggs are deposited.

It was only in the latter part of the locust season that per

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sons were stung by them, and I think it may be accounted for as follows: Those insects which had not deposited until late in the season were, perhaps, delayed after their time was fully come, and, in obedience to Nature's law, were driven suddenly to relieve themselves, and hence their tenacity in maintaining themselves upon the human flesh until their object was accomplished. This theory is supported by the facts that the eggs are so injurious to vegetation when deposited in the bark of trees, and that it was during only the latter part of the season, when they were depositing their eggs, that instances were known of persons having been stung or poisoned. In several instances which came to my knowledge, the locust resisted attempts to brush or throw it off until the deposit had been effected. The treatment in the case of a child stung, was bathing in salt water to reduce the inflammation, which extended rapidly, and further, to remove the cause of the inflammation, viz., the eggs deposited in the wound.

C. A. LEWIS.

Washington, D. C.

Submarine Engineering.

Among the many interesting things which the visitor to the rapidly-progressing railroad bridge will see, is the improved process by which men can work under water by a method which has taken the place of the former diving bell. So far as anything like a diving bell is concerned the operator carries it upon his head. The need for such labor is to level the rip rap rock which fills the spaces between the piles, and around them, just above the bottom of the river, to make a perfect sub-structure for the piers after the piles have been sawed off one or two feet above the bottom.

The contract for this work was taken by Mr. Perry, who has in his service for the under-water work, Mr. Quinn and Mr. King. We were at the place of one of the piers yesterday, and waited a few minutes to see Mr. Quinn come up after a four hours' submersion and hard work at the bottom of the river. On the edge of the flatboat stood Mr. King with a rope in one hand and an India rubber tube in the other, both extended out into the water and let out or drawn in to correspond with the motions of the man below, or to yield to, or counteract the strong current of the river, as rapid near the bottom as it was eighteen feet above at the surface. The rope was to communicate understood signals—the tube to convey a proper and uniform supply of air to the sub-aqueous man. Down stream large bubbles of air were almost constantly rising to the surface, air which Mr. Quinn no longer had any use for, or a surplus applied by a very ingeniously constructed air-pump by which three pistons were so adjusted upon a crooked revolving shaft that one of them was constantly and quickly forcing nearly a gallon of air within the sub-marine armor in which the operator was dressed.

A signal was given to ask if all was "right." Responsive twitches of the rope meant "all right." Soon after the signal was given for "dinner time." Then slowly crawled Mr. Quinn to a ladder suspended from the boat to the bottom of the river. The bubbles are seen further up stream—the rope and tube are gradually pulled in—the top of the ladder trembles and he is coming up slowly with his armor-dress of more than a hundred pounds heavier than the weight of his body. Out of the turbid water emerges a frightful head with a great square eye as large as a hand, in front, and a similar one on either side, but without hair, or mouth, or eyes, or any resemblance to the "human face divine." Human hands are seen on the ladder—an unwieldy outline of a human body is seen beneath the great head, nearly two feet in diameter. His assistants thumb a few screws and take on the copper helmet, revealing the good-looking English face of Mr. Quinn. Relieved of sixty pounds weight on his breast and back, and shoes with leaden soles of thirty pounds each, which, being removed, his canvass-rubber clothing is removed, and there he sits, or stands, a proper sized man in dry, ordinary clothing, only his naked hands having been wet.

So strong is the current of the river these sub-water men can scarcely stand against the force of the current, though borne down by armor and weights to the amount of 275 pounds. This weight is partly requisite on account of the amount of air inclosed, for breathing purposes, within the encasing armor. Except a slightly painful sensation from the pressure of condensed atmosphere in the ears, on the first practice of under-water work, they say that no other inconvenience arises from a temporary residence in Neptune's dominions, or, as we live on fresh water shore, we should say the realms of the Nymphs, Naids, or Potamids.

The sub-river men occasionally place a hand upon a fish, which naturally leaves that neighborhood, instanter, but whither he goes the diver cannot tell, for in the dark water of this river, at that depth, he cannot even distinguish the rope or the white air-tube more than six inches from his face, All this work of leveling and adjusting square rods of loose rock must be done by the sense of feeling, battling with the current upon his hands and knees.

Such are among the wonderful matters of science and skill going on within a mile or two of our city, and yet not one in a hundred knows the tenth part of the interesting things connected with the work of the great railroad bridge which is soon to span the river, and be as great a benefit to Dubuque as it is an honor to those who projected and to those who are building it.—*Dubuque Times.*

Brick Making by Machinery—The Gard Machine.

It is pleasant to say a good word for a really good thing, and such, we are convinced, is the brick machine invented by E. R. Gard, of Chicago, Ill., descriptions of which may be found on page 238, Vol. XIV., and page 132, Vol. XVI., SCIENTIFIC AMERICAN. These descriptions, however, of a machine not then perfected, do not convey a proper idea of the machine we saw in operation a few days ago, which turned out seventy perfect bricks per minute from raw clay, bricks so perfect that they could be "hacked" nine high from the machine without crumbling, defacement, or the necessity of previous drying. Fully equal to hand made, in other respects, these bricks present an edge face as smooth as that of the famous Philadelphia bricks, while their side faces are excellently well adapted to holding and retaining the mortar. The machine uses the clay just from the bank, nothing ever being required to be added but water, and that rarely, and turns out the perfected bricks at a rate only limited by the capacity of the workmen to remove them.

The confidence of the inventor in the superiority of his machine is evinced by his challenge to the owners of all other machines in the country, of a competitive trial on the fairest terms, the proceeds of the trial to be given to charitable objects. A full size working machine may be seen in operation in the rear of 59 Ann street, New York, from 9 A.M. to 3 P.M., and we suggest to our builders and others a visit. For descriptive pamphlet address E. R. Gard, New York City.

BARR'S IMPROVEMENT IN CENTRIFUGAL MACHINES.

The Weston Centrifugal Machine, becoming quite commonly known—over one hundred being now in use in sugar refineries—is a great improvement on the common machine by being self-balancing, a result obtained by suspending the rotating cylinder, allowing it to gyrate in accordance with the varying distribution of the load, thus greatly reducing the power necessary to drive the machine. This gyration is sometimes excessive and the object of the improvement illustrated in the engravings is to prevent this excess of movement without interfering with the productive results of the machine.

Fig. 1

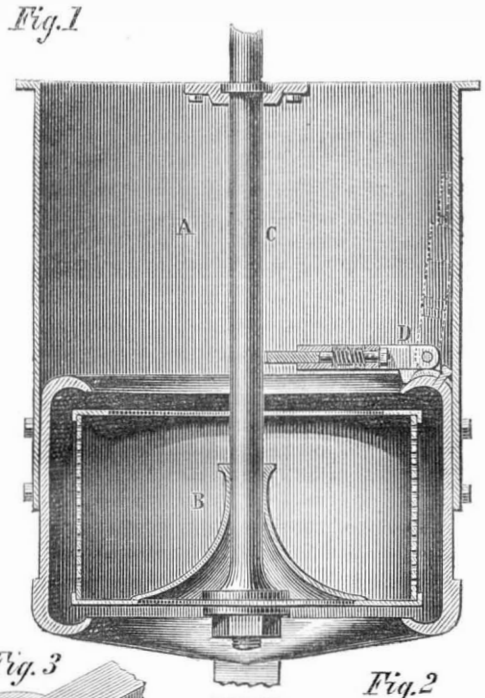

Fig. 3

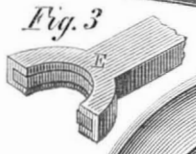

Fig. 2

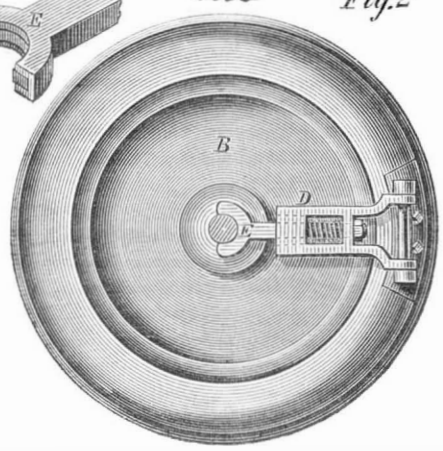

Fig. 1 is a vertical section showing the improvement; Fig. 2 is a plan or top view; and Fig. 3, a perspective view of the device itself, the clutch.

A is a stationary cylindrical case, suspended from timber or the ceiling of the room, and B is the revolving cylindrical vessel for receiving the sugar or other material to be operated upon, and having perforated sides. C is a vertical shaft by which this vessel is suspended. The improvement consists in a hinged frame, D, for guiding the shaft, and a clutch, E, working in the frame.

The frame, D, is hinged to the outer case, A, so that it and the clutch may be raised. When the clutch is in contact with the shaft, C, the frame and clutch are prevented from passing below a level by lugs on the side of the case near the pivot by which the frame and clutch are supported. The shank of the clutch is encircled by a spiral spring intended to yield sufficiently to the swing of the rotating cylinder, but also to check it to prevent it from gyrating beyond a certain limit. The tension of this spring and its consequent bearing against the shaft, C, is regulated by a nut on the end of the clutch shank.

The inventor of this improvement claims that by its use the expense of an attendant is avoided; the forked bar or clutch preventing the violent shocks and vibrations, which occur when the cylinder is unevenly loaded, and an unyielding bearing is employed. During the time of charging the machine the shaft is most liable to gyrate, and the forked rod is most needed, and the latter being of inconsiderable width and occupying but a small proportional space, does not interfere with the operation of charging.

Patented by Robert J. Barr, August 4, 1868. Letters may be addressed to him at 618 S. Delaware Ave., Philadelphia, Pa.

Inproved Method of Preserving Wood.

Patented April 14, 1868, by Theodore William Heinemann, New York city.

I first boil the wood in a weak solution of carbonate of soda or any other alkali, or muriatic acid (pure, crude, or waste materials will answer equally well, but of the pure, one part in fifty to two hundred of water is strong enough), until the liquor ceases to abstract color from the wood, which then is free of nitrogenous matter, and consequently no longer subject to spontaneous decay, and after drying in the usual way, if intended for use where it will not be exposed to the inroads of water, insects, etc., needs no other treatment. But if it be intended for railway sleepers, or purposes where it may be much exposed, or come in contact with nitrogenous or fermenting substances, I subject it to a second treatment in a close boiler, of suitable size and shape, strong enough to bear a very high pressure, conveniently fitted with an air-tight door, also with horizontal cross bars, which serve as braces to strengthen the boiler, and at the same time keep the wood from floating, with a safety valve, discharge cock, pressure-gage, and thermometer.

Into this boiler I put the wood, and with it enough rosin, when liquefied, to cover it, and sufficient water to fill, when converted into steam, the whole of the remaining space in the boiler. I then close the door tightly, and heat the boiler gradually until the thermometer shows the contents to be at about 306° Fah., when the rosin is as liquid and penetrating as boiling water, and the steam, being of a very high pressure, forces the rosin through all the pores of the wood. I keep the same temperature up just long enough to have the wood evenly heated all the way through, the time varying according to the thickness of the pieces treated. After that I lessen the heat gradually, until the thermometer shows the mass inside the boiler to have cooled down to about 200° Fah., when I suddenly raise the temperature again, and as soon as the rosin has become sufficiently liquid, I open the discharge-cock and allow it to drain off. The wood may then be taken out, and on cooling will be found very compact, hard, elastic, impervious to water, even if left in it for a long time, not subject to shrinking, warping, or the attacks of insects, and indestructible except by fire.

If it be desirable, however, to make the wood effectually resist even the power of the last-mentioned agent of destruction, I substitute soda or potash water-glass instead of the rosin, in the process last described, and after thoroughly impregnating it, dry it and allow it to lie for some time in muriatic acid or some concentrated solution of a metallic salt, which will make an insoluble silicate.

New Bridge at Niagara Falls.

They are building a new suspension bridge at Niagara close to the Falls, for carriages and foot passengers. On the American side the towers are within a few hundred feet of Falls, and the cables are already swung across to corresponding towers close to the Clifton House. In some respects this bridge is more remarkable than the other. In length it exceeds it 450 feet, being 1,250 feet in the span. The towers are 105 feet high, and are built 13½ feet apart. Unlike the heavy stone columns of the lower bridge, they are light wooded trestles, twenty-eight feet square at the base and tapering to the top. When finished they will be roofed and weatherboarded.

The bridge will be sustained by two cables, which were swung last winter when the ice filled the river below the Falls. The lower bridge is sustained by four cables. Those of the new bridge are composed of seven strands of twisted steel wire, each mustering two and three-eighths inches in diameter, which form a cable about nine inches thick. The ends are fastened by the new shackles invented by Mr. Hewlett, of Niagara, in a manner very different from that formerly adopted. The strands of the cable are untwisted at the ends, and hang separately from the tops of the towers. Each is secured to a separate shackle, which looks something like a pulley with a fixed wheel. These are grooved so as to hold the cable by means of friction, independent of the fastening at the ends, if necessary. The shackles are of various lengths, so as to divide the strain as much as possible, and are secured to a base firmly planted in beds of masonry eighteen feet square. This will probably hold the weight of the bridge against any ordinary pressure; and unless the slight towers are racked and weakened by the lateral motion caused by the high winds of the winter season, it will probably last as long as the other. The inside measurement of the bridge will be ten feet in the clear. As this will barely enable carriages to pass each other, it is a wonder that an additional two feet were not added when the cables were swung.

Novel Application of Asphalte.

The repellent property of asphalte bitumen with regard to water, which is so characteristic that samples of natural asphalte, though they contain much mineral matter, scarcely ever yield any moisture to analysis, has already led to its use for lining water tanks and cisterns which are not required to hold boiling water. Now, however, it is proposed to use it for canals as an economical and very desirable substitute for the ordinary puddling. But we need scarcely observe, it is only the best description of Seyssel asphalte that would answer the purpose in a satisfactory manner, and remain water

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tight for any length of time Instead of a great thickness of argilaceous material, called puddle, which is not always at hand, and only applied with great labor and expense, the bed of the canal would have to be lined with Seyssel asphalte to the thickness of about one inch and a quarter.

The application of asphalte to canals would doubtless help to keep the water they contain in a pure state, and do away with that stagnant mud in which water weeds of the coarsest description flourish and impede the progress of the barges, while it in hot weather gives rise to fœtid emanations as soon as the water sinks a little below its highest level.

For this purpose the artificial asphalte, which is nothing more than gas tar mixed up with calcareous grit and sand, would not be found adequate, as it cannot be expected to afford a durable or an even surface The necessity of employing natural asphalte for this and other purposes, instead of various artificial mixtures intended to imitate it, has been recently insisted on by an eminent engineer, who states that economy and durability are "only assured when the asphalte has a natural source like that shipped to London in large quantities from the mines of Pyrimont Seyssel, in the Jura mountains." These mines have been worked by the Seyssel Asphalte Company since the year 1838, the period at which the late Captain Claridge introduced their product to England, and are still, we understand, far from being exhausted. —*Scientific Review.*

Electric Clock in London.

A remarkable clock has been erected for public use at the top of the offices of the Liverpool and London and Globe Insurance Companies, at the junction of Cornhill and Lombard streets, where it forms one of the most conspicuous objects to be seen in the city. The *Mechanic's Magazine* contains the following description of it: "The object of the Electric Clock Company, by whom it was erected, was to make the 'globe' do duty as a clock face; some of its convexity has, therefore, been sacrificed, but the result is a novel and beautiful object, the interest of which is only exceeded by its utility. The globe is surrounded by gilt stars which indicate the hours, and by the shape of the dial so much light is thrown upon them that they are visible by night and by day, while the pointers contribute greatly to the general effect of the design. The clock requires no winding up. The dial is illuminated by Schaeffer's patent double burners; and by an ingenious apparatus the gas is turned off every morning and evening two minutes earlier and two minutes later every day as the days are lengthening or shortening, and it is adjustable as well for the foggy days of November as for the light nights of summer."

The Chinese Woman's Telegraph.

During the recent visit here of the Chinese Ambassadors, one of them stated in reply to the inquiries of a physician, that it was not customary in China, except among the lower classes of the people, for the doctor to see or touch female patients. In order to ascertain the pulse of the sick woman, a string is tied around her wrist and extended outside the window to the doctor, who holds the string between thumb and finger, and by this sort of telegraph is enabled to count the pulsations. This seems a ludicrous plan; but it is far less mischievous than our custom of admitting men doctors to the private apartments of females. The opportunities for the medical education of women in this country are yearly increasing; and we hope the day is not far distant when the ladies will be able to rout the men from the sick room, and compel them to stand out in the cold, under the window sill. In China only women nurses attend during child-birth.

Charcoal Crucibles.

Mr. Gore communicates to the *Philosophical Magazine* an excellent way of making charcoal crucibles, etc. He first shapes the articles out of wood, and he finds that lignum vitæ, kingwood, ebony, and beech answer best. After the vessel has been formed, the wood is carefully dried in a warm place. The articles are then enclosed in a copper tube retort having two exit tubes for the escape of gas. This retort is heated slowly at first, and finally for some time to bright redness, to completely carbonize the wooden vessel. It is necessary, Mr. Gore says, to turn the retort continually, and so distribute the heat, that none of the tarry matter evolved may condense upon the articles; otherwise, he tells us, their shape and dimensions may be curiously altered. The heating is to be continued until no more gas is evolved, and care must be taken not to heat too rapidly, or the article will fall to pieces Charcoal made in this way from lignum vitæ is remarkably hard, and the texture is so close as to make it apparently quite impervious to liquids; even after immersion in the strongest hydrofluoric acid the surface had no acid taste. Rods made of this lignum vitæ charcoal, conduct electricity admirably, and would probably, Mr. Gore says, answer well for pencils for the electric arc.

FORTY MILES OF SNOW SHEDS.—The Pacific Railroad Company are now engaged in erecting sheds over the cuttings and other exposed points. They are of heavy timber framework, with pointed gable roofs, and look as if they could withstand almost any pressure of snow. Nearly forty miles of the track will have to be thus covered, and the quantity of timber required will be enormous. Not less than twenty-two saw-mills, most of them worked by steam, are run night and day, employing nearly two thousand men; and yet they do not work up to the needs of the Company. It is estimated that it will require no less than eight hundred thousand feet of lumber to construct a mile of sheds So great is the demand that the country on both sides of the track is being rapidly denuded of its forests.

Editorial Summary.

WHITE GUNPOWDER.—A correspondent writes us upon the subject of white gunpowder. The drift of his communication seems to be that it is not suitable for blasting. We agree with him that it is too costly, and makes too much smoke, which is annoying to miners; but we can scarcely see how our article, which was intended to be a general review of the subject, as discussed in scientific journals of this and other counties, could justify the opinion that we supposed it adapted to mining or quarrying. We even took ground against its use for heavy artillery, and only admitted the possibility of its adaption to small arms. The fact that it is apt to explode, during the operation of tamping, is to be inferred from the directions we gave for its use, and its cost should be compared only with that of fine gunpowder, and not with coarse and cheap blasting powder with which we had no intention of comparing it

RECIPE FOR TOMATO KETCHUP.—Remove the skins by pouring scalding water over the tomatoes in a pan. Simmer the fruit at least one hour (a longer time will not injure); using sufficient water to keep from scorching. When cool wring the mass through a piece of coarse cotton or linen cloth wet in cold water. To each gallon of liquor add 2 tablespoonful whole black pepper, one-third teaspoonful of pure cayenne pepper (ground), and 1 tablespoonful of cloves. Boil the whole until reduced one-third. Add 2 tablespoonfuls fine salt to every gallon while hot, and when cold strain out the spice and bottle. No vinegar is used. Will keep for years; but if scum rises at any time re-boil and add a little more seasoning.

THE BRITISH PATENT OFFICE.—In 1867, 2,284 patents were passed, and 2 253 specifications were filed. 2,528 applications for Letters Patent lapsed or were forfeited by neglect to proceed for patents within the six months of protection. The fees received in the year 1867 (by stamps) amounted to £112,843. The fees paid to the Attorney-General and Solicitor-General, and their clerks amounted to £11,115; and the salaries and expenses of the office, compensation annuities, printing, and other expenditure, with the payment of the revenue stamp duty of £20,820, left a surplus income for the year of £42,840. The Commissioners—the Lord Chancellor, Master of the Rolls, Attorney-General, and Solicitor-General—renew their representation of the need of a suitable building for the Patent Office.

LIFE IN THE SEA.—Two well known naturalists, Dr. Carpenter and Professor Thomson, of Belfast, are engaged in a dredging expedition, to the westward of the Faroe Islands. This will decide the question whether there are living creatures in the deepest parts of the sea. Eminent authorities (the late Professor Edward Forbes among others, according to *Chamber's Journal*) have maintained that the pressure at the lower depths was too great to allow of existence being carried on—that there was not sufficient light—and that the water contained too little air.

THE velocipede is suggested as a substitute for the horse for the rapid transportation of infantry. Celerity of movement is the desideratum; for it is a maxim that the strength of an army, like the power in mechanics, is estimated by multiplying the mass by the rapidity. Now, as to comparative speed. Recently, in France, there was a race between a velocipedist and a horseman for a distance of forty-five miles, when the latter won by only twenty-five minutes, after a run of six hours. It is stated that but for a head wind that blew all the time the machine would have won. Imagine a body of troops moving on the enemy mounted on the velocipede. It would be a great sight.

THE proposition has been made to make a canal across Southern Michigan to connect Lakes Michigan and Erie, and thus save the grain laden vessels eastward bound a voyage of about 400 miles which they are now obliged to make around the southern peninsula of the Wolverine State. Another proposition of a similar nature is a canal through Canada connecting Lakes Huron and Ontario. Both are said to be feasible, and the latter can be accomplished, the engineers think, for $40,000,000. This, however, is not so important as the route from Lake Michigan to Lake Erie, as but a small proportion of the commerce of the lakes extends to Lake Ontario.

It has long been contended that steel boilers never could be used, not being sufficiently tenacious. But this theory has been badly damaged by some recent experiments at Pittsburg where a steel boiler has withstood the most pressure that could be brought to bear upon it. The boiler is made of two plates of No 3 steel, ¼ inch thick, 6 feet long, and 38 inches in diameter. It has been subjected to several tests, the 10th trial giving it a pressure of 725 pounds to the square inch. Experiments on it continue, but up to this writing no pressure has been able to burst the boiler. It has stretched three inches since the tests commenced.

WOUNDS BY THE CHASSEPOT RIFLE.—Experiments have recently been made at the camp of Lyons on the bodies of dead horses, with the view of ascertaining the precise character of the wounds produced by conical bullets discharged from the Chassepot musket. It is said that the aperture made by the projectile at the moment it penetrates the flesh is commonly no larger than ordinary pea, but that the rotary movement of the ball revolving on its axis gradually enlarges its circles until it makes a hole into which a person could thrust both fists.

THE foreign exports of petroleum, from the United States, from January 1 to September 12, have been as follows, for the years indicated: 1868 67.921.290 gallons; 1867, 41 949,820 gallons; 1866, 39.792,292 gallons; 1865, 12.680,524 gallons. Received at New York, from January 1 to September 12; 1868, 692,029 barrels; 1867, 792,507 barrels.

A NEW Russian invention is a letter-box, so contrived that when a letter is deposited, it gives the depositor a ticket in exchange, showing the date when the letter was put in the box. We are not informed whether the Government is expected to assume any responsibility not already assumed in regard to the safe delivery of letters. If not, what is the invention worth?

CATTLE PLAGUE IN RUSSIA.—The cattle plague is making great ravages in the governments of Pskof and Novgorod. The disease has also made its appearance in the environs of St. Petersburg and Moscow. One of the Russian papers remarks that the cattle plague will do more mischief in the empire than a thousand Polish insurrections.

UNDER the Ming dynasty, in China, paper money issued by the government is inscribed with the hint that it must be received as coin and that whoever refuses to so receive it shall have his head cut off. There is no premium on gold or discussion as to how the currency shall be redeemed, in China.

AN Albany mechanic has invented a process of manufacturing paper boxes by pressing the pulp in molds. They come out fit for immediate use, and can be made quicker and cheaper than from the board.

EARTHQUAKE AT GIBRALTAR.—There has lately been an earthquake at Gibraltar, the first which occurred for many years. Two distinct shocks were felt, but it does not appear that any serious damage resulted.

A MAN in Lynn, Mass., a few days ago made fifteen pairs of ladies' gaiters in less than ten hours, making seven dollars and fifty cents. This is the greatest feat known to be accomplished by any shoemaker.

PROF. WHITTLESEY has discovered evidences of the residence of man at the High Rock Spring, Saratoga, just 4,840 years ago, or about six centuries before the deluge.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

From January 1st to September 1st, this year, the receipts of lumber at Chicago were 659,317,000 feet, and 157,117,000 shingles.

The Detroit Car Company have a contract for 200 platform cars for the Union Pacific Railroad.

The Society of Arts, London, has offered prizes for the best improved models of railway meat-vans, milk-vans, and milk-cans.

The earnings of western railroads, as shown in the official reports, indicate a large increase in their business.

The cost of the iron bridge to be erected by the Union Pacific Railroad Company over the Missouri river will probably not fall below two millions of dollars.

The first woolen mill built in Minneapolis, Minnesota, was the North Star Woolen Mill erected in 1864. It is of stone, seventy by fifty feet, and four stories high.

Two bonded yards for railroad iron have been established at Detroit for the accommodation of the Grand Rapids and Indiana Railroad Company who are receiving large quantities from abroad.

There has been a large falling off in the business of ship-building in Maine this year. Instead of from twenty to thirty first-class ships, as has heretofore been the case at Bath, only seven ships of 1,200 tuns each have been built this year.

There are 557 woolen mills in the seven states of Ohio, Michigan, Indiana, Illinois, Iowa, Wisconsin, and Minnesota. Their aggregate capital is $5,448,000.

The Taunton Machine Company is to build a pulley for its own use which, will be 30 feet in diameter, and the pit lathe in which it is to be constructed, it is said will cost over $5,000.

There are ten factories in St. Louis engaged in the manufacture of hide-covered saddletrees which are principally sold in New York, Newark and Philadelphia. The wood used is mostly hackberry and sycamore, which is very soft when green and easily worked but which hardens very fast.

Mount Vista, about ten miles from Saratoga, a bluff rising directly from some table land to a hight of 500 feet, is found to be composed of a pure white sienite granite, equal or superior to any Eastern granite for monumental or other purposes, with a grain so fine that after dressing it resembles marble.

An iron mountain, five miles long and two hundred feet high, has been found in Cobden, Ill. It is within three miles of the Illinois Central Railroad and a large part of the land belongs to that corporation. The iron crops out all along the ridge and is of extra purity.

The St. Louis bridge over the Mississippi is expected to be completed by the summer of 1871, and the St. Louis merchants are anxiously awaiting the day. Now it costs them twelve cents a barrel to send flour 1,500 yards across the river, while it costs only twenty cents a barrel to send it to New Orleans, 1,200 miles below.

The Government machine shop at Charlestown Mass., has just completed the largest planing machine in the United States, and they think, the largest in the world It will plane a piece of iron forty feet long, twenty feet wide, and twenty feet high. One of the bed pieces weighs over forty tuns. Seth Wilmarth, the master machinist of the yard, was the designer.

It is only fourteen years ago that a grand excursion was made to St. Anthony's Falls, on the completion of the Chicago and Rock Island Railroad, in celebration of the finished railroad connection of the Atlantic and the Mississippi, and yet to-day, there are no less than twenty-five railroads that strike that great river between St. Louis and St. Paul.

The grasshoppers were so thick on the Missouri Valley Railroad track as to cause the wheels to slip and delay the morning train two hours on the 14th inst. It was several times necessary to stop the train and sprinkle dirt on the track to make the wheels bite.

The Reading Railroad Company own 16.355 cars of all kinds, and 268 locomotives. Were these all placed in one line upon the track they would make up a train forty miles in length. The greatest distance yet run by any engine of the company has been accomplished by the engine Atlas, which has traveled 363,000 miles, or about fifteen times the earth's circumference.

Lynn has shipped 35,800 cases of shoes during the past three months slightly in excess of last year's shipment. The total number of pairs in this immense pile would be about 2,148,000, and the aggregate value $2,864,000.

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In the Illinois Penitentiary eight hundred convicts are employed in mechanical trades. Two hundred and fifty are in the cooper shops, ninety make shoes, forty-four make cigars, and there are thirty harness makers.

The Everett Mills, in Lawrence, Mass., run 30,000 spindles, employ 1,000 hands, use every week 12,000 pounds of wool and 20 000 pounds of cotton; and produce in the same time, 100,000 yards of goods, principally flannel shirtings, cotton and cot on wool fabrics, dress goods, and shawls.

Work upon the Iron Mountain Railroad between St. Louis and the South is going on rapidly. Track laying will be finished to a point four miles below Farmington within sixty days, and the track has already been laid from Belmont to Charleston. Fifteen hundred men are employed upon the line in and at the tunnel, fifty miles from Bismarck; four sets of hands are constantly employed working night and day. This tunnel is twelve hundred feet in length.

Experiments have recently been made at the camp of Lyons on the bodies of dead horses, with the view of ascertaining the precise character of the wounds produced by conical bullets discharged by the Chassepot muskets. It is said that the aperture made by the projectile at the moment it penetrates the flesh is commonly no larger than an ordinary pea, but that the rotatory movement of the ball revolving on its axis gradually enlarges its circles until it makes a hole into which a person could thrust both fists

CHROMATE OF IRON.—This mineral, which is found so abundantly in Maryland and Pennsylvania, has recently been used for alloying iron and steel to considerable extent, and with highly satisfactory results, the steel made from the mixture being the hardest known. Works for its manufacture have recently been erected, and a company formed whose capital is $400,000, which are in active operation. The extension of the use of this mineral for hardening various manufactures of iron is now under experiment; and if the results prove satisfactory, the consumption of chrome ore, or chromate of iron, as it is technically termed, will be greatly increased.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents

LAMP FEEDER.—T. P. Gibbons, Baltimore, Md.—The object of this invention is to provide a cheap and convenient device by which lighted lamps can be filled at any time with perfect safety.

SNOW PLOW FOR RAILROADS.—Jenkins Jones and T. G. Eiswald, Providence, R. I.—The object of this invention is to construct a snow plow for railroads which shall operate more easily and effectually than those heretofore in use, and by which the snow may be thrown upon either side of the track, as may be desired.

STOVE.—Henry D. Snyder, Carbondale, Pa.—The object of this invention is to so improve the culm or anthracite burning stove, that better combustion of the fuel will be effected, and the heat be better radiated than heretofore. while the outer wall of the stove can be opened all around the fire box so as to diffuse the cheerful radiance of the fire on every side. The stove can, also, be readily changed and adapted to burning different kinds of coal and wood.

WATER ELEVATOR.—C. F. Woodruff, Newbern, Tenn.—The object of this invention is to furnish a simple and neat device by which, after raising a bucket of water from the well, the bucket can be readily and conveniently lowered into the water again without reversing the motion of the crank by which it was raised. This device is an improvement on one patented by the same party Feb. 4, 1868.

CLOTHES WRINGER.—Josiah Webb, Spartansburgh, Pa.—This invention consists in the peculiar method of constructing and arranging the compressing rolls, whereby the water is more completely expressed from the clothes, and whereby, also, the rubber coating of the rolls can be easily adjusted and tightened when it works loose.

PROCESS FOR PREPARING SULPHATE OF BARYTES.—Page and Krausse, St. Louis, Mo.—This process is a simple and effective series of operations for treating the mineral known as sulphate of barryta or heavy spar, so called whereby the mineral is refined and reduced to a fine powder known in commerce as sulphate of barytes.

GUIDE FOR SCROLL SAWING.—G. W. Staats. Newcastle, Pa.—The object of this invention is to enable irregular figures and curves to be sawn from wood by a scroll saw without the necessity of working to a line, which latter operation is properly performed by a skilled workman, beside requiring the figure to be marked to the wood to guide the operator.

GROUND AUGER MACHINE.—Jacob M. Walter, and Samuel Shank. Springfield, Ohio.—The object of this invention is to provide a machine for boring post holes in the ground, which is effective, easily and conveniently operated and adjutable to operate upon side hills. It consists of a hinged auger shaft whereby the earth lifted by the auger may be conveniently deposited away from the hole, together with windlass and cord mechanism for lifting the auger shaft vertically from the hole. It further consists in the form of the boring disk, and hinged or pivoted uprights supporting the boring and lifting mechanism, the said uprights vibrating in contact with slotted semicircular plates affixed to the bed frame of the machine which serve in conjunction with clamp borers and screw studs in the uprights to adjust the uprights and the auger shaft in a vertical position when the hole is to be bored on a side hill and the bed frame is necessarily inclined from the horizontal.

TENONING MACHINE.—William McKnight, Clearfield, Pa.—The object of this invention is to provide an apparatus by means of which tennons of any suitable angle and slope, both in the tennon and shoulder of the same, may be cut in an expeditious and accurate manner. It consists of a frame having devices for adjusting and holding the wood to be cut in such a manner that the tennon when cut will be straight or tapered, or the shoulders of the same will be straight or mitered as may be desired and having, also suitable guides for the plane. It further consists of a tennoning plane having a shear iron, in combination with the frame above mentioned.

SAWING MACHINE.—Samuel Yarion, deceased, Corunna, Mich.—This invention refers to a portable machine designed more particularly for felling trees and for cutting the same up into dimensions suitable for portability or for consumption as fuel, and is peculiarly simple and effective in accomplishing the same.

LIFTING MACHINE.—Andrew Kriebel Hereford, Pa.—This machine has for its object to furnish a simple, cheap, and convenient machine, designed especially to enable the end of an endless chain horse power to be easily and conveniently raised by one man, to receive the trestle, so as to give a proper inclination to the endless chain of the machine.

WAGON JACK.—E. R. Baldwin, Southfield, Mass.—The object of this invention is to provide a wagon jack that may be operated with greater ease than those now in use, and which is more especially adapted for raising heavy trucks and carts which stand low, but which may also be used with equal facility for high and light wagons.

SEED COVERER.—E. D. Cramer, Hackettstown, N. J.—This invention relates to a new device for covering the seed behind a planting or seeding machine, and consists of a triangular frame which rests on three or more wheels and which is attached behind a planter or seeding machine, so as to follow its motion. On the two sides of the frame, which converge directly in front, are secured metal plates that are up and down adjustable these; plates acting as scrapers for covering the seed.

ADJUSTABLE CARRIAGE POLE.—M. A. Koon. Catskill, N. Y.—This invention relates to that class of carriage poles which can be adjusted to carriages, sleighs, or other vehicles, in which the clips may be set at any suitable distance apart and to any length of axle.

CORN HARVESTER.—Nelson Newman, Springfield, Ill.—This invention relates to a new and improved device for picking the ears of indian corn from the standing stalks.

COMBINED CORN PLANTER AND CULTIVATOR.—John S. Mason, Coal Run, Ohio.—This invention relates to a combination of a corn planter and cultivator, and it consists in a peculiar construction and arrangement of the same.

WRENCH.—Luke Chapman, Collinsville, Conn.—This invention has for its object to furnish an improved wrench, simple in construction, comparatively inexpensive in manufacture, strong, and convenient.

ANGULAR SHAFT COUPLING.—John M. Case, Worthington, Ohio.—This invention has for its object to improve the construction of my angular shaft coupling, patented March 10. 1868, and numbered 75,364, so as to make it simpler and cheaper in construction, and equally efficacious in use.

PLAYING CARDS.—J. J. Levy, New York city.—This invention relates to a new manner of forming the edges of playing cards, for the purpose of facilitating the shuffling of the same, and to prevent them from spitting. It also consists in providing the cards with beveled edges when double beveled or single, so that they are narrower at the edge than in the middle.

BEEHIVE.—Orrin Field, Independence, Iowa.—This invention consists in a peculiar construction of the hive, the manner of arranging the comb frames, etc, whereby a very desirable hive is obtained, all the comb frames rendered very accessible, and all of them rendered capable of being renewed when necessary

PACKING, PRESSING, AND WEIGHING WOOL, ETC.—A. W. Fox, Columbiaville, Mich.—This invention relates to a machine for packing, pressing, and weighing wool and other similar substances, and it consists in a novel construction and arrangement of parts.

REFRIGERATOR.—Wilson Bray, Stockton, N. J.—This invention relates to an improvement in refrigerators, and the improvement is applicable to railway provision cars as well as to stationary refrigerators, both on a large and small scale.

HEATING RAILWAY CARS BY STEAM.—W. B. Farwell, New York city.—This invention relates to certain improvements in heating railway cars by steam taken from the boiler of the locomotive by which the cars are drawn.

WAGON AXLE.—C. D. Bachelder, Camden, Me.—This invention consists in providing an oil recess in the body of the journal of the axle, and a sleeve which is put on over the axle oil tight, to confine the oil in the recess, having a slot communicating with the recess in the axle through which the oil is fed by a wick to the wearing parts.

CONSTRUCTION OF CHAIR SEATS.—E. L. Buckingham, Jefferson, Wis.—This invention consists in a method of fastening the rod or splint to the frame of the seat by providing oblique slots through the rails from about the center of the inner edge, downward and outward, terminating in the bottom face of the rails near the outer edge, and in passing the strips of which the bottom is to be woven through the said slots, instead of through vertical holes, as heretofore; and it further consists in providing tenons on the back ends of the side rails, to be secured in corresponding holes in the hind posts.

KITCHEN IMPLEMENT.—Charles S. Westland and John B. Allen, Providence, R. I.—The object of this invention is to provide an implement available both as a stove-plate lifter and a holder for knives, forks, and spoons, which latter will, when so held by the implement, be conveniently accessible to the person employed in cooking.

BLOCKING CHAIN.—Peter Kendrick, Trenton, N. J.—This invention relates to a device for facilitating the driving of wooden blocks in chains, such as are used for mining purposes.

SULKY PLOW.—J. R. McConnell, Marengo, Iowa.—This invention relates to a sulky plow, and it consists in a peculiar construction of the same, whereby ease of draft, uniformity in the depth of furrow, and complete control over the machine by the driver, is obtained.

DEVICE FOR CONDUCTING GRAIN TO THRASHING MACHINES.—A. W. Lockhart, Sacramento, Cal.—This invention relates to a device for conducting grain, from the stack or from wagons, to trashing machines, thereby effecting a great saving in labor in thrashing grain.

STEAM ENGINE.—Thomas A. Nizer, Hamilton, Ohio.—This invention relates to that class of steam engines which are known as rotary engines, and it consists in a novel construction and arrangement of parts.

GAS APPARATUS.—John W. Brown, Wooster, Ohio.—This invention relates to improvements in apparatus for generating and purifying coal gas, for illuminating and other purposes, whereby the apparatus is adapted to household or domestic use, and the flow of gas to the gas holder is regulated automatically, and the surplus gas used as fuel.

MACHINE FOR STUFFING COLLARS.—William Fauntleroy, New Harmony, Ind.—This invention consists of a collar board pivoted centrally on a suitable bench, whereon the leather portion of the collar is stretched and secured with both ends open, and a pulley made to operate by a foot lever, over which a belt works, to which a stuffing mandrel is connected, which is guided by one hand, while by the other the straw on the filling is fed into the mouths of the collar, and the strap actuates the mandrel to pack the filling. When the collar has been filled at one end to the center, the collar board is swung around to present the other end to the operator.

MORTISING AND SLOTTING AUGER.—Peter Cunningham, Eckley, Pa.—The object of this invention is to provide an auger with which the operations of mortising and slotting may be performed rapidly. Patented Sept. 1, 1868.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

W. L. B., of N. Y.—There is nothing that will remove rust from polished steel and leave a smooth surface. Iron rust is dissolved by acids, but they will attack the polished metal. The only remedy we can recommend is repolishing.

A. J. G., of Kansas.—The amount of water that can be raised to a given hight by the hydraulic ram, working under a given head, is limited only by the size of the ram and the supply. Hydraulic Rams are manufactured by W. and B. Douglass, Middletown, Conn.

J. J., of Ill.—If wheat is not allowed to sweat before grinding, the flour will sweat after grinding; but this may take place without injury or loss more than is usual in the complete drying of the grain. We believe the best flour is made from wheat which has passed through this stage before grinding. The bolting cloths made in Holland are of silk, instead of thistle fiber as you have been informed.

M. H. R., of Mass.,—All other things being equal, increased length of a water pipe diminishes the flow. In your case, if we understand it, the flow through the aperture at the junction of the pipe with the cistern depends upon the pressure of the water in the reservoir. Beyond a length sufficient to compensate for the contracted vein a pipe will be of no advantage.

F. C. C., of Me.—There are different theories in regard to why the ocean is salt. Some think there may be large deposits of salt somewhere at the bottom of the ocean which by dissolving have rendered it salt. Some think that the sea obtained its salt at the time the globe was in the act of subsiding from a gaseous state. We are better satisfied to believe that it results from the evaporation of the water which is constantly flowing into the sea, which, although it may appear fresh to the taste, always or nearly always contains more or less salt absorbed from the earth during its flow. In this view the ocean bed is a immense caldron in which nature has been boiling away water for ages; the salt remaining in the kettle, precisely as it does in the saltworks, only very much slower.

G. W. B., of S. C.—A good waterproof cement may be made simply of powdered clay, dried by a gentle heat and mixed to the consistency of a paste with boiled linseed oil. It may be thinned with turpentine, colored with ochres or other pigments, and used for covering metallic roofs.

M. A. K., of Conn.—We have frequently restored faded flowers by immersing a portion of their stems in very hot water and allowing them to remain until the water is cool; then, removing them, cutting off the scalded portion of the stems and placing them in a vase of cold water.

A. H., of R. I., says that sawdust is the best bedding for horses he has ever tried. It possesses all the qualities necessary; it is an absorbent, a deodorizer, and a fertilizer, keeps the horse's skin in a healthy condition, and does not contaminate the clothes of the attendant with offensive smells.

P. T., of Mass, says: "Having seen in the SCIENTIFIC AMERICAN several notices of attempts to procure a substitute for ivory in the manufacture of billiard balls, my attention has been drawn to the subject, and I am surprised that no attempt has been made to utilize the seeds of the *macrocarpa*, or *microcarpa*, a sort of palm growing in the valleys of the Peruvian Andes. These seeds, large enough for billiard balls, have an apparent structure similar to bone, but are hard and elastic like ivory. I think they might receive and retain color; they can be handsomely polished."

Business and Personal.

The charge for insertion under this head is one dollar a line.

For State and County rights to the best and cheapest sorghum stripper now in use, address C. P. Hale, Calhoun, Ky. Agents wanted.

Wanted—purchasers for a valuable patent right—large business can be done. Address G. Knell, 130 Market st., Philadelphia.

Manufacturers of steam engines, water wheels, flour and saw mill machinery, cotton gins, etc., etc., send circulars to A. W. Bunsen, machinist and millwright, New Braunfels, Texas.

To say that the siccohast, invented by Asahel Wheeler, Boston, is superior to any other dryer for linseed oil, and cheaper, is but reiterating the words of Mr. John H. Peck, chief painter and chemist at the Washington Navy Yard, and many other good mechanics, among whom are Messrs. Barney & Styles, of New York.

Wickersham's American oil feeders oils loose pulleys, it being the most perfect, reliable, and economical plan for that purpose in the world

For sale—State rights of a valuable patent for an article used in every household. Apply at room 12, No. 113 Water st., New York, between the hours of 10 and 12, M.

To inventors—a gentleman of energy and experience in the management of an agency business, desires the general agency, for Ontario, of some really valuable patent of general utility. Address Box 1092, Toronto, Canada.

Hardware dealers and manufacturers, address, for circular and sample of best sash lock in use, O. E. Woodbury, Madison, Wis.

For sale cheap—a small adjustable steam press for vulcanizing rubber or other light work. Address A. W. Gates, 418 Eighth avenue, New York.

For sale—a complete set of the "Scientific American," neatly bound, (31 volumes), old and new series; also, odd volumes. Address L. M. Montgomery, Box 2953, New York.

Parties about to buy steam boilers should examine Root's wrought iron sectional safety boiler at 95 and 97 Liberty st., New York. See advertisement.

To inventors.—I will furnish means to patent some useful invention, or will take an interest in a patent, if sufficient inducements are offered. Address, with stamp, J. K. Ross, Noblesville, Ind.

Wanted,—Makensie No. 2 2d-hand cupola. N. C. Stiles, Middletown, Conn.

Wanted—a machine suitable to crush quartz and bones. Send circulars and price list to E. D. S., Postoffice box 708, New Orleans.

Millstone-dressing diamond machine, simple, effective, and durable. Also, Glazier's diamonds, diamond drills, tools for mining, and other purposes. Send stamp for circular. J. Dickinson, 64 Nassau st., N.Y.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws Apply to J. E. Emerson, Trenton, N. J.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Winans' anti-incrustation powder, 11 Wall st., N. Y. 20,000 references. No foaming. No injury. 12 years in use. Imitations plenty.

NEW PUBLICATIONS.

CONSTRUCTION OF IRON ROOFS. F. Campin, C E., member Nat. Acad. Great Brit., etc. New York: D. Van Nostrand, 192 Broadway.

The increasing use of iron in the construction of buildings, and especially in the construction of self-supporting roofs, combining lightness and strength, seems to make this treatise of peculiar value at this time. The subject of iron roofs is treated practically and also theoretically, the formulæ for strain being equally applicable to timber structures. The volume is illustrated with eight plates, showing the details of such work, taken from buildings actually erected.

AMERICAN HOUSES A Variety of Original Designs for Rural Buildings Illustrated by Twenty-six Colored Engravings with Descriptive references. By Samuel Sloan, Architect. Philadelphia: Henry Carey Baird, 406 Walnut street. Sent free of postage on receipt of $2.50.

The object of this book, as announced by the author, is to present a number of designs in an attractive dress, that may either serve as models to build from, or criterions by which the projector may judge of the relative quality and merits of his intended edifice. It will prove of value to such as need some guide in forming a judgment upon designs, and who, meditating the erection of rural buildings, wish for some hints upon the subject before consulting an architect. Architects also will find useful studies in this book, and we especially recommend it to beginners and students.

A TREATISE ON OPTICS. or Sight and Light Theoretically and Practically Treated, with the Application to Fine Arts and Industrial Pursuits. By E. Nugent, C. E. With one hundred and three Illustrations. New York: D. Van Nostrand, 192 Broadway.

This is a work written in popular and pleasing style, and adapted to the wants of those who have not time or the preliminary education requisite for the study of larger works. To all such we can recommend it.

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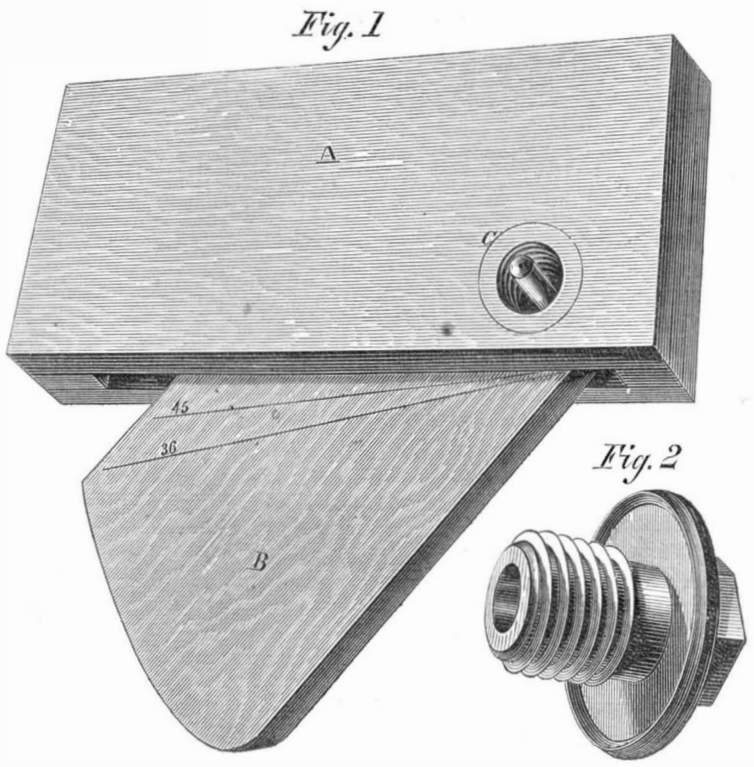
Improvement in Hanging and Retaining Center-Boards.

For shallow water, and also for deep water when vessels of great relative breadth of beam and slight immersion are employed, the center-board is invaluable, holding, while in use, the vessel closely to the wind, without impeding its motion through the water. There are some objections to its use, the principal owing to the method of hanging the board, allowing leakage and its consequent dangers and annoyances. The usual method is simply to drive a pin through the walls of the well or trunk and the board, which in time becomes corroded and loosened, and when the board is to be removed must be driven out from either side.



STORER'S PATENT CENTER-BOARD ATTACHMENT.

The engraving presents a view of an improved plan of hanging the center boards of vessels for which a patent was issued January 8, 1867. The trunk, A, is of usual form, the board or blade, B, hung on a pivot at C. This pivot is a simple pin of steel, iron, or composition, having its bearings, not in the walls of the trunk, but in a screw socket or nut seen enlarged in Fig. 2. The hole in this socket for the reception of the pin is not bored through, but the nut end of the socket forms a cap. The shank of the socket nut has cut on it a sharp thread for seating into the wood of the trunk, and the inner side of the flange is formed into a sharp annulus or ring that seats itself into the outside of the trunk, forming a ring, as at C, and making a perfectly water-tight joint, entirely preventing all possibility of leakage. If thought advisable, a flange or gasket of rubber or leather may be introduced under the flange of the socket nut. The pin, bearing entirely on the metal of the sockets, may be lubricated, and to prevent wear the orifice through the blade or board may be lined with a metallic sheath. When it is necessary to remove the board, it may be done simply by unscrewing one of the nuts and taking out the pin, which is perfectly loose.

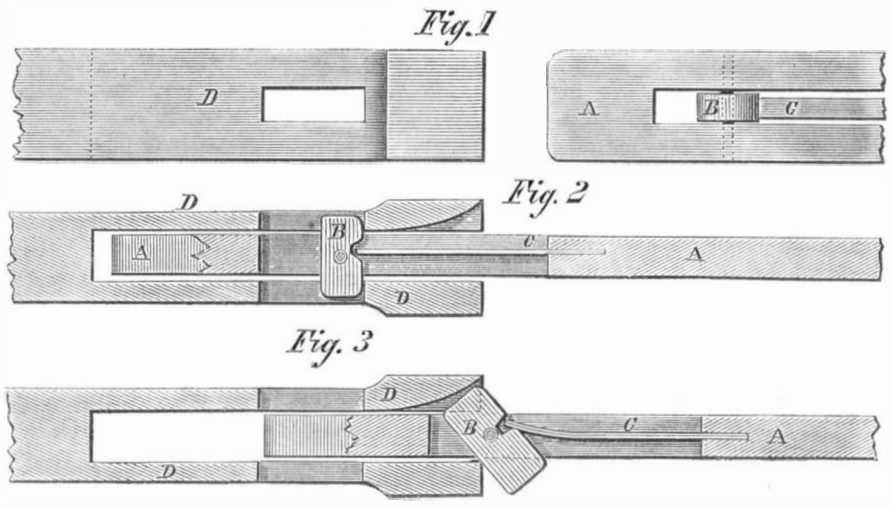
This device has been thoroughly tested for over two years —before the date of the patent—by sailing masters, and owners of yachts, fishing and pleasure boats, and has proved satisfactory to each and all. It has been found to be a device saving time and annoyance, and considered to be better in every respect than the ordinary method of hanging center boards.

Letters may be addressed to either of the patentees, George Storer, or George W. Storer, at Middletown, Conn.

Improvement in Car Coupling.

The inventor of the coupling shown in the accompanying engravings has for his object to furnish a simple, convenient, strong, safe, and reliable car coupling, which shall also be so constructed as to uncouple itself should one or more cars of a train be over-turned or thrown from the track. Fig, 1, is a plan or top view of the contrivance; Fig. 2, a longitudinal vertical section with the coupling block engaged, and Fig. 3, the same with the coupling disengaged.

A is the coupling bar having near its end a long slot, in the forward part of which is pivoted the block or catch, B. C is a spring the rear end of which is secured in a slot in the coupling bar, and its forward end resting in a notch in the middle of the rear side of the block, B, its object being to hold the block at right angles to the line of the bar. D are parallel spring bars, the rear ends being attached to the draft bar of the car, and projecting at a distance apart equal to the thickness of the coupling bar. These springs are mortised to receive the length of the coupling bar between their jaws. One of the spring bars, D, is mortised or beveled in the line of the proposed movement of the coupling bar and its catch-block, so that when the cars are run together, the bar, A, and coupling block, B, may engage with the spring bars, D, the latter being forced into place by the spring, C. The cars will then be securely coupled, while sufficient transverse motion is allowed for the rounding of curves, etc. If one or more cars "jump" the track the spring of the bars, D, will allow the block to be disengaged and the car to hold to the track without being carried by those before it to destruction. When in a line with the train and it is desirous to uncouple, it may be done by pressing down one end of the bar or block, B, to a position parallel with the length of the coupling bar, when it will readily slide out and disconnect the cars. If thought desirable, the spring bars, D, may be incased or covered to protect them and to guide the coupling bar in entering the space between them. The spring bars should be made of steel or of flexible iron.



HARDY'S AUTOMATIC CAR COUPLING.

Patented through the Scientific American Patent Agency, August 4, 1868, by Clinton R. Hardy, who may be addressed at Lexington, Ind., for territorial or manufacturing rights.

DYNAMITE---REVIEW OF A PAPER BY M. NOBEL, THE INVENTOR.

M. Nobel, the inventor of dynamite, recently read an interesting paper upon the substance before the British Association, at Norwich, England. He stated that the name dynamite had not been given to this explosive by way of disguise, but on account of its peculiar explosive properties. Although it was nothing but nitro-glycerin absorbed by highly porous silica, its properties are so much altered as to warrant a new denomination. Dynamite consists of seventy-five per cent of nitro-glycerin, and twenty-five per cent silica. It might be supposed from its composition, that it would possess only three-fourths the explosive power of nitro-glycerin, the specific gravity of both being nearly the same. But practically there is no advantage in the greater concentration of the power of the latter substance. It cannot, or at least it ought not to be poured directly into the bore-hole, since it easily causes accidents by leaking into crevices, where it explodes under the miner's tools. It must therefore be used in cartridges which leave considerable windage; whereas dynamite, being somewhat pasty, yields to the slightest pressure, so as to completely fill up the sides of the bore-hole. For this reason, a given bore-hole will receive at a charge as much nitro-glycerin, in the form of dynamite, as in the liquid state.

M. Nobel then gave an extended account of the different experiments which had established the claims of dynamite to efficiency and safety. Most of these have already been placed before our readers, and we will therefore only allude to one of a somewhat extraordinary character, performed at Stockholm, in Sweden. A weight of 200 pounds was dropped from a hight of 20 feet upon a box containing dynamite, which was violently crushed without an explosion. This adds to the already accumulated evidence that dynamite cannot be exploded by percussion.

The inventor proceeded to say that the danger attending the use of nitro-glycerin, indirectly resulted from its liquid form. Much as has been written on the danger of congealed nitro-glycerin, he believes that if the solid form was its natural state at ordinary temperatures, we should hardly have had to deplore a single one of those fatal accidents which it has caused. He asserts that crystallized nitro-glycerin is not more sensitive to concussion than the liquid, and states that the reverse is the case in a remarkable degree. Nearly all the calamities referred to have occurred from leakage, which, owing to various causes—the principal of which is the tendency of this substance to expand by increase of external temperature—it is well nigh impossible to prevent. He states that he can hardly remember a cargo that has reached its destination without leakage. He thinks it wrong to blame nitro-glycerin for a practical difficulty of this kind, and supports his position by the fact that nearly all the accidents which have occurred (as at Aspinwall and San Francisco) have taken place when it was forwarded under wrong declaration, and consequently the necessity of cautious handling was not known.

It seems to us, however, that M. Nobel proves too much by these statements, and that they are much more likely to confirm the belief in the dangerous character of nitro-glycerin, than to convince the public of its safety.

The case is, however, different in regard to dynamite, which can be handled without danger, and is in no degree inferior in explosive power. There have been already fifty tuns of the latter sold, and reports are unanimously concurrent in its favor. The prominent point which ought to be considered in estimating the value of dynamite as a blasting agent, is the fact that a smaller bore-hole than has hitherto been required will contain a sufficient charge to perform a given amount of work, thus largely reducing the expense of drilling. It is estimated that at least one-third of the labor required when gunpowder is used, is thus saved, and, so far as we can form an opinion from the various reports we have seen, we are inclined to think this is within reasonable limits.

UNIFORM STANDARD FOR BOLTS AND NUTS—ITS ADOPTION BY THE NAVY DEPARTMENT.

We have before us the report of a board of naval officers appointed by Hon. Gideon Welles, Secretary of the Navy, March 28th, to investigate the different systems for forming the threads of bolts and nuts and their relative sizes. The board consisted of Chief Engineers Isherwood, Henderson, and Zeller, and Assistant Engineer Greene, of the Navy. They visited the establishments of the principal tool and machinery builders in Boston and Springfield, Mass.; Providence, R. I.; New York city, Newark, N. J., and Philadelphia and Pittsburg, Pa., and also addressed letters of inquiry to other localities. The result of their labors is a very exhaustive report, illustrated with tables and diagrams, together with mathematical formulæ, which will be found to be very interesting to machinists and engineers. After a thorough examination of the systems of Whitworth, of England, Sellers, of Philadelphia—known as the "American Standard" and recommended by the Franklin Institute—and that of Robert Briggs, the board recommended that of Sellers as the best. Accordingly the Secretary of the Navy, on the day after the receipt of the report—May 16th—ordered its adoption as the standard for the naval service.

The form of thread is that we have heretofore described and advocated, a V-thread with inclination of 60°, the top and bottom flattened equal to one eighth of the pitch. We append a table of the number of threads and the diameter of bolts:

Diameter of bolt.	No. of threads.	Diameter of bolt.	No. of threads.
¼	20	2	4½
5-16	18	2¼	4½
⅜	16	2½	4
7-16	14	2¾	4
½	13	3	3½
9-16	12	3¼	3½
⅝	11	3½	3¼
¾	10	3¾	3
⅞	9	4	3
1	8	4¼	2½
1⅛	7	4½	2¾
1¼	7	4¾	2¾
1⅜	6	5	2½
1½	6	5¼	2½
1⅝	5½	5½	2¾
1¾	5	5¾	2¾
1⅞	5	6	2¾

The board, in concluding their report, say: "So far as we have been able to confer with engineers and manufacturers, either personally or by letter, we have heard but one opinion expressed in regard to the importance of uniformity of practice. Many have already adopted the Sellers pitch; others are gradually adopting it, while others still express their willingness to adopt it. A majority, we confidently believe, are now willing to adopt the Sellers *form* of thread also, provided it be made the standard.

"As a proper auxiliary we suggest the importance of having all necessary gages manufactured by a single establishment, as by that means only can entire uniformity be secured."

We regard this report and the consequent order as a step in the right direction. Whether there may be uniformity in the relative dimensions of the bolt shank and the head and nut or not, it is of manifest importance that there should be in the form and number of threads. The fractional pitch of the threads in the inch and five eighths and most of the sizes following may be considered objectionable by some, but it is no great difficulty to procure additional gears by which these grades can be cut by almost any leading screw; beside, these large sizes are not so frequently used as the smaller sizes. The recommendation that the gages should be made by one concern, for the sake of uniformity, we also approve.

This American Standard departs less from the proportions generally in use in this country than any other standard, and this is another argument in its favor. As to the form of the thread, we doubt if any other combines so perfectly the elements of strength, ease of production, and safety.

BUFFALOES FOR THE CENTRAL PARK.—From a private letter just received from Abilene, Kansas, we learn that three full grown bisons captured on the plains are soon to be sent from that place to New York city as a contribution to the Central Park collection.

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NEW YORK, WEDNESDAY, SEPTEMBER 30, 1868.

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THINGS EASY AND DIFFICULT.

The easiest things to be done are not by any means the easiest things to be described, while on the contrary, those things which are most easily described are often the most difficult to accomplish. The more complicated the mechanism used to obtain a given result the more complicated and extended are the rules for its use and manipulation. Large volumes have been written upon the use of the steam engine yet a person of ordinary intelligence can soon learn to manage one of these iron giants. The operation of file cutting could be described in the space this article will occupy, yet it would take years of practice for any one to become a very successful file cutter. The two examples we have cited illustrate the important principle, that it is easier to learn the manipulation of a machine designed to perform any given work than to attain skill in performing the same work by manual labor.

In no department of the arts is this more manifest than in the use and manufacture of musical instruments. The violin, devoid of keys, composed of three elements, a sounding board or shell, strings, and the bow which agitates the strings, is in mechanical construction the simplest of all instruments having much scope or expression. It and the instruments of its class are correspondingly the most difficult to play of any known instruments, requiring the most laborious efforts, even on the part of those endowed with great musical genius, to arrive at perfection in execution and expression. The difficulties of learning to perform skillfully on the violin consist not in comprehending how to do, it is the *doing itself*. It is not the education of the mind but of the muscles that is difficult.

This leads to another important fact connected with this subject, namely, that in most cases the education of the muscles to delicate manipulation is more difficult than the acquisition by the mind of the principles which govern and direct it.

If then strength of will in the overcoming of difficulties is an element of greatness, the artist who can skillfully perform is greater than the critic who can only tell how work should be done without being able himself to put in practice his own teaching. This truth is felt by all competent workmen and is the cause of their impatience with the criticisms of men who are only able to approve or disapprove their work without being able to execute it themselves. Such impatience is fostered by the arrogance of critics, who imagine that they are superior to their hard-handed subordinates and put on airs accordingly. Let one of these doff his gloves and take his place at the lathe, vice, or planer, and show that he can do as well as direct, and the respect of those who submit to his dictations will be an assured thing. There are many of these kid-glove gentry in the mechanic as well as the fine arts. Professional critics, who can do nothing but look on in this age of progress, are not wanted. Young man, just emerging from your polytechnic institute, your school of mining, or chemical laboratory, remember that proportionally as you add practical knowledge to your other acquirements you will successfully control men and advance in station.

STREET DUST LAID BY THE USE OF CHEMICALS.

A patent was taken out in England, last September, relating to the application of a compound of deliquescent salts to the prevention of dust upon roadways. This season, extensive experiments have been made to test the value of the invention, and the results seem very favorable. It is estimated that it costs $500,000 dollars per annum to water the streets of London, and notwithstanding this enormous outlay, the dust cannot be laid. The demand for something more effectual has given rise to the invention referred to. The composition used is from ½lb. to 1 lb. of the mixed chlorides of calcium and sodium to one gallon of water. The salts are put in the cart and the water is then taken in. By the time the cart is full, the salts are dissolved. Although we have had sufficient rain in New York and Brooklyn, as well as in other parts of the country, the season in England has been remarkably dry, and consequently very unfavorable to the development of the principle upon which this invention is based, viz: the retention of moisture by the mixed chlorides. The reports, however, are remarkably favorable. It produces a most important effect upon the surfaces of macadamized roads, hardening and concreting the material in such a manner that when it is perfectly dry, no dust arises from the passage of ordinary traffic. The light dust always found upon a dry road surface, watered with plain water, is not to be seen. The surface remains firm with the absence of detritus. The roads are thus rendered more durable, while the chlorides being anti-putrescent, a sanitary advantage is gained, at the same time that economy in the use of water is secured—important considerations in all large cities.

The shopkeepers, along the streets where this composition has been used, have given their testimony in its favor. They state that, instead of having their shops filled with dust, they can scarcely see a particle, and on Sundays, while other streets are smothered in dust, they rejoice in immunity from this nuisance.

The chlorides used are cheap, and obtainable in large quantities. The chloride of calcium has not been in large demand heretofore, but can be manufactured to any extent. There seems no practical difficulty in the use of these salts, and we hope that a trial of them will be made in this country. The city of Calcutta, in India, is about to test the method. The dust is said to be intolerable there, and of a most damaging nature to clothing, etc., as the roads are made of brick, easily pulverized by the feet of horses and the wheels of vehicles.

THE EARTHQUAKE TERM.

Our mother earth is passing through one of those periods of convulsion the phenomena of which are among the most terrible of all the manifestations of physical forces. The throbbings of the earth crust, which have extended over so vast an area during the last twelve months, the meteoric shower, and the meteorological phenomena during the same period, are together an interesting subject of study. What mysterious connection exists between these occurrences, if any does exist, or rather the real nature of it, has never been satisfactorily shown; and there is yet, perhaps, room for skepticism upon the hypothesis that the cosmical matter from which the enormous number of meteors periodically rain upon the earth's surface has any direct agency in these disturbances. That the weather and other atmospherical phenomena are influenced by some cause acting in concert with the causes of earthquakes, if not by the same causes, must be admitted. It would be interesting to review in this connection the histories of some of the most remarkable earthquakes on record; we will, however, allude only to one, which destroyed the city of Caracas, in Venezuela, in 1812. The shocks of this earthquake continued at intervals for months previous to the above catastrophe, and were felt with more or less violence from the mouth of the Ohio river to that of the St. Francis, in the United States. Fissures were opened, lakes disappeared, trees were felled, and such changes produced in the general appearance of the surface that a tract 70 to 80 miles in length and 30 miles wide along the Whitewater river and its branches has ever since been called the "sunk country." The traces of the fissures and chasms produced at that time were visible for years, and were noticed by Flint, the geographer, seven years after their occurrence, and Lyell, the geologist, as late as 1846. Such were the effects of this convulsion in our own land. Throughout Mexico and Central America they were still more remarkable, increasing in intensity as they extended further south, finally terminating with the destruction of Caracas, which involved the almost instantaneous death of 12,000 people. The atmospheric phenomena during the period preceding the final great convulsion was exceedingly peculiar. Electrical discharges from an apparently cloudless sky were frequent. Vivid auroral displays were more than ordinarily common. At New Madrid, below St. Louis, the inhabitants were at one time surprised and alarmed by the appearance of the sky, which although cloudless, presented along the western horizon a most brilliant electrical display. A continued glare of most vivid lightning, accompanied by what was at the time supposed to be incessant thunder, appeared to proceed from below the horizon, and coupled with the preceding alarming events, produced great terror in the minds of the people.

The present season has presented great climatic peculiarities. From all parts of the world come accounts of hurricanes, floods, unusual vagaries of temperature, and prevalence of winds from unusual quarters. The *Scientific Review*, speaking of the extraordinary heat and drouth experienced in England, says: "The southerly winds have prevailed for an unusually long interval, and the weather has consequently been very hot and very dry. On the 22d of July it was possible to cook a beef steak on the south side of Westminster Bridge by the heat of the sun's rays alone. The apparatus employed was of a very simple kind; it consisted of an empty cigar box, the inside of which had been blackened, and the top closed with three panes of glass about one inch apart. In the course of twenty minutes the steak was done on both sides, while a few potatoes were baked around it."

With the south winds and the extreme heat in England have appeared the mosquito, which threatens to become a pest in a country hitherto exempt from that annoying insect. The peculiarities of our climate during the last twelve months have attracted much attention. Both extreme cold and heat have been experienced, and these extremes have continued for extraordinary periods, while we have had unusual storms of wind and rain. All this indicates unusual atmospheric disturbances. Overhead and underfoot the elements are warring with terrific energy. The recent eruption of Vesuvius, the earthquakes in the West Indies and the Sandwich Islands, the meteoric fall of 1866 and 1867, the alleged shifting of the Gulf Stream nearer to the eastern continent, and above all the accounts just received of the disastrous earthquake in southern Peru and Ecuador, exceeded in destructive effect by only two similar events on record, constitute a series of remarkable occurrences which may not perhaps be rashly regarded as the commencement of an epoch of permanent physical and climatic change to which the earth is destined. Some will see in these events the fulfillment of prophecy, and the indications of moral and political changes not less momentous.

The causes which produce the grand and terrible phenomena of earthquakes are doubtless various. The generation of gases by chemical reaction, and the development of enormous volumes of superheated steam, by the contact of water with the intensely heated interior of the earth, are without doubt the most common and potent. The distance below the surface at which these forces act, although undoubtedly great, is unknown. The sensations produced upon people by earthquake shocks have peculiarities which must be felt to be realized, as it is impossible to give any adequate description of them. The most graphic description we have ever heard, was given to us by a gentleman who has experienced several of these occurrences both at sea and on land. The sensation at sea he says is often described as resembling the shock produced by a ship's striking upon a reef, but there is a feeling of something different, a sort of instinct of something further away and more powerful, which accompanies the first feeling of surprise and alarm, a sort of mysterious pulsation through the water, which once experienced is not easily forgotten. On land he describes it as being like what would be the feeling of a person standing upon a flexible, buoyant substance, like an immense tarpaulin spread over the surface of a liquid mass in a state of violent agitation. The undulations succeed each other so rapidly and irregularly that it is impossible to time one's steps to meet them, persons are suddenly and violently prostrated, while the mysterious subterranean noises, the peculiar appearance of the sky and atmosphere, the universal alarm of all living things, conspire to produce the most appalling spectacle that the imagination can conceive.

The accounts received from Ecuador and Peru indicate a disaster of almost unparalleled extent, and the misery which must inevitably result will appeal to the sympathy and the charity of the entire civilized world. Whether it will prove the grand finale of the present earthquake term, or whether other disasters are to follow, no mortal can say. Time only can determine this, but we trust that the giant forces which have produced such wide spread devastation and death have expended their energies, and the earth may again "rest for a season."

INQUISITIVENESS---OUR CORRESPONDENTS.

Most people are inclined to think inquisitiveness a very disagreeable characteristic, and it must be admitted that when it expends itself upon the acquisition of a minute knowledge of other people's business, no other adjective can be found which seems more applicable, unless it be some which are prohibited in polite intercourse. But although in personal and private concerns this quality renders its possessor an unmitigated nuisance, in matters of science and philosophy it is the prime motor. The great discoveries that have ever been made have resulted from inquisitiveness. There are those who seem to believe that *acquisitiveness* is the great stimulus to progress, and we do not deny that it has had a large share in initiating and forwarding the enterprises, and improvements which characterize the present age; but before acquisitiveness will induce men to aid in the investigation of any subject, the inquisitiveness of those who demand from nature the revelation of her mysteries, must be rewarded by such plain and direct responses, as to give some warrant for the assumption of pecuniary risks.

Such inquisitivenes is the chief attribute of philosophical minds. It has stimulated the Newtons, Watts, Franklins, Faradays, and Ericssons of past and present ages to plunge into the most laborious and complicated investigations, for their own sake. The search after knowledge, for the pure love of it, is what has paved the way for all the great achievements which have so ameliorated the condition of mankind.

The position of this journal, upon the relative merits of of practical science and speculative philosophy, must be well understood by our readers. We have been opposed to abstract speculation beyond certain limits, and except for the purpose of opening the way to real and earnest investigation of facts. The inquisitiveness of which we speak is never satisfied with hypotheses. The positive or negative response of actual experiment is its ultimatum, and until that be reached it will not be content. No man, however gifted by nature or improved by culture, can be perfectly sure that in forming a theory he has embraced all the facts which relate to it. Prof. Tyndall has said, that "the true physical philosopher will never rest content with an inference, when an experiment to verify or contravene it is possible." We are daily in receipt of theories upon all manner of subjects—some of them crude, some of them remarkably ingenious. That the most of

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these are not published is perhaps a matter of surprise to our correspondents. We are always glad to publish anything that we consider suggestive, or likely to lead to useful research. Many communications, although they may contain entirely erroneous statements and false reasoning, are noticed because they afford an opportunity for the imparting of useful information, or the correction of popular errors. Our readers would be surprised, were we to merely give the titles of some of the communications we receive. Here is a correspondent who writes us upon the duality of sex in the human brain; another who thinks there is a relation between the phenomena of thought and the planets Venus and Mercury; still another who most dogmatically states that he has without experiment, by pure reasoning, discovered the relation of matter in its ultimate condition, and wishes us to occupy four columns of space with his ideas upon the subject. In striking contrast with these is one from a school-boy, asking for information upon a subject which shows that he is inquisitive in the right direction, and couched in language which gives evidence of improved opportunities, and large promise for the future. Welcome, my lad! Your inquiry shall receive attention in due time, while other more pretentious, but far less valuable correspondence, finds its way into the waste-basket.

COPPERED IRON ROLLERS FOR CALICO PRINTING.

The last number of the London *Mechanics' Magazine* says, that to save a portion of the large amount of capital invested in copper printing rollers by calico manufacturers which lies necessarily idle, "the Swiss printers have been experimenting," and with complete success, with iron rollers coated with copper of sufficient thickness to allow of the pattern being engraved upon it. The mode of coating adopted by the Swiss is said to be a secret; but there are several plans by which a thin layer of copper can be obtained upon which as much metal as may be wished can be thrown down by the ordinary electrotype process. We have published several modes of coppering iron already, and add one more devised by Weiskopf. He first brushes the object (say roller) over with a solution made by dissolving one part of nitrate of copper in fifty parts of hydrochloric acid; and afterward with a second solution of ten parts nitrate of copper, ten parts chloride of copper, and eighty parts hydrochloric acid. This latter solution is applied very quickly with a soft brush The copper is deposited in a few seconds, and the object must be rinsed immediately in cold water and wiped with a soft cloth. By repeating the application of this second solution the copper coating may be obtained of any desired thickness. This process, the author says, is to be recommended for its simplicity, cheapness. and the durability of the copper layer. Our own experience with the coating of copper with acid solutions similar to this has shown us that unless the application be made very quickly indeed, the copper does not adhere firmly to the iron and is apt to blister and peel off. For coating rollers, therefore, we should recommend an alkaline process—either Weil's or the old cyanide plan. When the pattern is out of date, the Swiss convert the old roller into a new one by covering all parts of the roller except the engraved pattern, with an insulating varnish, then immersing it in a bath, to fill up the pattern with freshly deposited copper. The roller is then ready to have a new pattern engraved upon it."

We can scarcely reconcile the two statements in the above extract that the Swiss process is a "secret," and that they "immerse the roller in a bath" to fill up, by deposition, the depressions of the engraving. We have, also, very little faith in coating iron rollers with copper for calico printing by the electrotype process. Several plans for coating iron with copper by deposition have been proposed, but we have yet to know of any that have been entirely successful—that is, have produced a perfect homogeneous and solid coating It is almost impossible to make the surface of the iron so chemically clean and to so free it from all minute irregularities that the copper will combine with it and secure a perfect copper covered surface. The colors used in printing frequently contain acids, and if the slightest pin hole exists in the copper covering these acids would certainly affect the colors by the oxidation of the iron, and tend to undermine the copper.

The rollers used in calico printing are hollow, to receive a mandrel, but are composed entirely of copper. When the pattern engraved on a set of rollers has been used sufficiently, the roller is turned in a lathe to remove the engraving, and then ground and polished. Thus the roller may be used for a large number of patterns, being re-engraved and turned until the shell becomes too thin. The worn out roller and the turnings are worth nearly if not quite as much as pig copper to be wrought over again.

We have often thought that iron rollers might be substituted for those made entirely of copper, having a casing of copper— not, however. deposited by the battery—but a sheath or hollow cylinder of copper might be forced upon the iron core by hydraulic pressure and made of sufficient thickness to be engraved and used for printing a number of times. This would seem to be more reasonable than the plan proposed by the *Mechanics' Magazine*, as it would be certain to secure solid metal for the reception of the engraving.

THE QUALITY OF ILLUMINATING GAS.

In looking over our exchanges we notice frequent complaints in regard to the poor quality of illuminating gas furnished by the different gas manufacturing companies These complaints are not confined to particular cities, but seem to be nearly universal. Some seem to cling, however, to the idea that it is not the quality of the gas that is at fault, but the meters. In an article entitled "Gas Measurement," published on page 337, Vol. XVIII. of the SCIENTIFIC AMERICAN, we showed that the meters were unjustly blamed for the want of uniformity in the expense of illumination through corresponding portions of the year, and that the real fault was to be referred to the inferior quality of gas furnished by the manufacturers.

It is not unfrequently the case that the standard of quality is allowed to sink so low that three feet of gas give no better illumination than two feet of the proper quality ought to give. The three feet of poor gas cost the producers but little more than two feet of good gas, and the companies add largely to their dividends by the fraud. When the murmurings of the public begin to be troublesome and seem to threaten opposition, up goes the standard, and the clamor subsides for a season.

It is high time that a remedy for such wholesale imposition should be prescribed. The standard of quality should be fixed by law, in lieu of anything better; but we are confident that our suggestion contained in the article above referred to would be a much better check than any legislation upon the subject could be. The suggestion referred to was the invention of a meter that should register for quality as well as quantity. The idea seems to us perfectly practicable, and the man who can invent a cheap and accurate apparatus by which the daily quality of gas, as well as its average quality for a given time, can be registered, would find a buyer in nearly every consumer of gas. With such tell-tales in every house, gas companies could not practice the irregularities hitherto complained of. People would know what they were buying and would be on an equal footing with the monopolists, who, not content with legitimate profits, seek to swell their gains by depreciating the quality of their products.

We know of no more promising field for inventive genius than this, and we are confident a rich reward awaits the inventor that shall succeed in supplying this growing want in all gas-consuming towns.

OFFICIAL EXAMINATION OF APPLICATIONS FOR PATENTS.

Applications for patents are distributed into thirty-six different classes under the following classifications:

I. AGRICULTURE. II. AGRICULTURAL PRODUCTS (Preparation of). III. BUILDERS' HARDWARE. IV. CALORIFICS. V. CARRIAGES. VI. CHEMICAL PROCESSES. VII. CIVIL ENGINEERING. VIII. CLAY MANUFACTURES. IX. COMPOSITIONS. X. FELTING AND HAT MAKING. XI. FINE ARTS. XII. FIRE-ARMS. XIII. GLASS MANUFACTURE. XIV. GRINDING MILLS. XV. HARVESTERS. XVI. HOUSEHOLD FURNITURE. XVII. HYDRAULICS AND PNEUMATICS. XVIII. ILLUMINATION. XIX. LEATHER MANUFACTURES. XX. MECHANICAL ENGINEERING. XXI. METALLURGY. XXII. METAL WORKING. XXIII. NAVIGATION. XXIV. PAPER MAKING. XXV. PHILOSOPHICAL INSTRUMENTS. XXVI. PRESSES. XXVII. PRINTING AND STATIONERY. XXVIII. RAILROADS AND CARS. XXIX. SEWING MACHINES. XXX. SPORTS, GAMES, AND TOYS. XXXI. STEAM AND AIR ENGINES. XXXII STONE WORKING. XXXIII. SURGICAL APPARATUS. XXXIV. TEXTILE MANUFACTURES. XXXV. WEARING APPAREL. XXXVI. WOOD WORKING.

These classes are distributed to twenty principal examiners, and their assistants, and each class embraces a variety of subjects, as for example class thirty-six, devoted to "Wood-Working," contains nearly 500 modifications of machines and implements applied to that branch of industry. Now when an application for a patent is filed it goes to the class or subdivision to which it belongs, and is examined when that comes up, and not upon the plan adopted by the miller who grinds out his grist in regular rotation.

It would not be possible for an examiner to get through with his cases properly unless he should take up and dispose of all that relate to the same subject on his file. This explantion will enable applicants for patents to understand why some cases remain longer than others in the Patent Office.

PATENT OFFICE MATTERS.

Commissioner Foote has appointed James S. Grinnell chief clerk, in place of A M. Stout, resigned Mr. Grinnell was for several years chief clerk in the Agricultural Department, but more recently Examiner in charge of the class of Lumber in the Patent Office. He is a gentleman well qualified to perform the duties of the office, and his appointment, we are sure, will give satisfaction to inventors, and all others who have occasion to do business with the Patent Office. General W. H. Browne, of this city, has been appointed a First Assistant Examiner and assigned to duty with General Schoepf in the classes of Land Conveyance and Mechanical Engineering. Horace Binney, of Philadelphia, Pa., has also been appointed a First Assistant, and Emmett Quinn a Second Assistant Examiner.

The Commissioner, in order to reduce the expenses of the office, has notified a number of those engaged in the model rooms that their services will not be required after the 1st proximo; and there will also, we understand, be a reduction of the clerical force in the draftsmen's and other rooms, after that date.

Perpetual Motion.

An exhibition of a "Perpetual Motion" machine is now going on at Wilkesbarre, Pa., which seems to astonish the natives, if we may judge from the laudatory editorials of some of the papers in that region. One of our Wilkesbarre cotemporaries says:

"We are free to confess that we were disappointed in point of mechanism; it is one of the finest pieces of mechanism that we ever saw, and in a scientific point of view it is a puzzler, and worthy a visit from every mechanic and every philosopher, and we are satisfied that all will be pleased as well as astonished. To describe this wonder of the nineteenth century is a task, and beyond the possibility of description, and must be seen to be understood.

"The power is derived from four brass balls weighing each four and one half ounces, operating upon a combination of levers so combined as to give the long end of each in favor of the power, and while the ball on one end is passing down by its own gravity through an arc of 90°, the other end of the lever, loaded with a ball of the same weight, is being carried up through an arc of 95°, the difference between the arcs being occasioned by the inclination of the planes by which the balls are conveyed from one end of the levers to the other. This excess of distance through which the balls pass on the end of resistance seems to be easily overcome by the third lever, which is attached to the second in such a way that it describes a greater arc than is described on the descending end, which seems a contradiction in mechanics, and yet it is so, and at the same time retaining the balance of power in favor of the end of power.

"While the ball in its descent is twelve inches from the fulcrum, the point of resistance is but one; it is therefore certain that whatever weight the descending ball may have, multiplied by the difference between the point of power and point of resistance, would give the potential power of the machine; and it is manifest that a ball of four-and-a-half ounces will exert an influence equal to fifty-six ounces on the machine. Wonderful as this may seem, yet it must be so

"To describe this beautiful piece of mechanism, is out of the question, and the more we say seems only the more to bother the mind; we, therefore, advise those who are interested, if an opportunity offers, to go and see it and solve the problem for themselves. The man who ventures a negative opinion on any question in this nineteenth century, stands on slippery ground. We prefer to see rather than denounce."

Genius is capable of wonderful things to be sure, and no man can fix its limits But the most ingenious machines, if they operate at all, must move in accordance with natural laws. The phenomenon which astonishes our editorial friend is that of a 4½ ounce ball going down hill and at the same time drawing up the hill a weight of 56 ounces. This apparent contradiction has bothered his mind out of its common sense.

The Berks County self-motor is nothing but a piece of mechanical legerdemain, deriving its motion from a concealed source, probably a clock work or an electro-magnet. Such "perpetual motions" are very old.

An engraving of a machine answering somewhat to the description of the "Berks," was published and explained some years ago in the SCIENTIFIC AMERICAN.

Trial Trip of the First Locomotive.

Major Horatio Allen, the engineer of the New York and Erie Railroad, gives the following account of the first trip made by a locomotive on this continent:

"When was it? Who was it? And who awakened its energies and directed its movements? It was in the year 1828, on the banks of the Lackawaxen, at the commencement of the railroads connecting the canal of the Delaware and Hudson Canal Company with their coal mines—and he who addresses you was the only person on that locomotive. The circumstances which led to my being alone on the road were these: The road had been built in the summer; the structure was of hemlock timber, and rails of large dimensions notched on caps placed far apart. The timber had cracked and warped from exposure to the sun. After about three hundred feet of straight line, the road crossed the Lackawaxen creek on trestle work about thirty feet high, with a curve of three hundred and fifty-five to four hundred feet radius. The impression was very general that the iron monster would either break down the road, or it would leave the track at the curve and plunge into the creek.

"My reply to such apprehensions was that it was too late to consider the probability of such occurrences; there was no other course than to have a trial made of the strange animal which had been brought here at great expense; but that it was not necessary that more than one should be involved in its fate; that I would take the first ride alone, and the time would come when I should look back to the incident with great interest.

"As I placed my hand on the throttle-valve handle, I was undecided whether I would move slowly or with a fair degree of speed; but believing that the road would prove safe, and preferring, if we did go down, to go handsomely, and without any evidence of timidity, I started with considerable velocity, passed the curve over the creek safely, and was soon out of hearing of the vast assemblage. At the end of two or three miles I reversed the valve the valve and returned without accident, having thus made the first railroad trip by locomotive, on the Western hemisphere."

Conduction of Air and Hydrogen.

Prof. Tyndall, in his lecture on "Vibratory Motion" at the Royal Institution, illustrated the very low conducting power of hydrogen for sound by a novel experiment. A bell struck by clockwork was placed under the receiver of an air pump, and the air exhausted as perfectly as possible. By applying the ear close to the glass a faint sound could still be heard. The exhausted receiver was then filled with hydrogen, when the bell was again heard to sound, but faintly. On pumping out the hydrogen all trace of sound ceased, even when the ear was placed close to the receiver. Hydrogen being about fifteen times lighter than air, it might be supposed that its low conducting power arose from its tenuity. But such is not the case; the conducting power of air, rarefied fifteen fold, and therefore of the same density, exceeds that of hydrogen in a marked degree.

IT is stated that timber rendered fire proof by saturation with silicates is extensively used in Germany for flooring planks, doors, and staircases.

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THE NEW TEMPLE EMANUEL.

The above is the name of the new Jewish synagogue recently dedicated situated on Fifth avenue and Forty-third street, New York city. Few buildings ever erected in this country, have attracted more attention, or are more entitled to admiration than this edifice. As a specimen of Moorish architecture, slightly modified to adapt the structure to its destined use, it affords a good study to professional architects and to all lovers of art. It occupies a lot one hundred and four feet on Fifth avenue, and one hundred and eighty-four feet on Forty-third street. It consists of a nave thirty-four feet wide, one hundred and sixty feet long, and seventy-two feet high, with transepts of about ninety feet in length, attached to which are aisles about twenty feet wide, containing the galleries. In front, on either side of the nave, rise two towers detached above the aisle walls, but connected with the nave by two bridges on a line with its ceiling and with the choir gallery, as well as by open balconies running all around the front. These towers are to be about one hundred and seventy feet high, and are to terminate in stone cupolas, the surfaces of which are to be covered with relief ornaments. The building is built of sandstone, out of the New Jersey, Cleveland, and New Brunswick quarries—each of these being used and a ranged with reference to its color. The entire cost of the structure and ground will amount to nearly a million dollars. The architects elected by the building committee were Mr Leopold Eidlitz and Mr. Henry Feuerbach.

The *Evening Post* gives a graphic description of the new temple and designates it as a "poem in stone:"

"All admirers of fine architecture will first be impressed with the façade. Its fine proportions, varied color, and rich ornamentation are elements of beauty worthy of close study. The openings of the nave—the five entrance doors, the rose window and the transverse gallery near the apex—together with those of the tower crowned with open octagonal domes, are so many distinct forms hapily grouped and tastefully treated The ornamentation throughout is honest, appropriate, and rich. Foliated capitals, delicately sculptured, and clustered columns attached to the doors and windows, fretted spandrils and light pinnacles, rising like minarets from the buttresses of nave and transepts, supply imaginative points of great value in the matter of expression. The bright cream-colored pinnacles relieving against a blue sky and on the brown rubble, sparkling like so many jewels in their setting, animate the entire front and forestall anything like monotony of outline. Various intaglio designs, consisting of intricate mazes of lines peculiar to the Moorish system of decoration, fascinate the eye and enliven surfaces that would otherwise appear sombre. This fine combination of ample forms and ornamental devices, each in appropriate relationship for use and beauty, secures to this building an elegant and majestic air, which more ostentatious structures of greater magnitude fail to convey. The secret of this effect does not lie in size or in richness of decoration, but in proportion, a quality of all others in architectural art the subtlest and most rarely encountered.

USE OF COLOR.

"Attractive as the exterior is, the interior far surpasses it. On entering the building we seem transported to another sphere. Here we enter on the realm of color; forms seem to have vanished or to resolve themselves into radiant splendor. Color as an architectural element appears to reign supreme; we have that which the Orientals, the acknowledged masters of this element of art, most delighted in. The problem they have solved through the skillful handling of ornament, and a consequent distribution of color, is the production of general effects not only pleasing in themselves, but also harmonizing with the constructive masses. The Jews in their Bible, and the Mohammedans in their Koran, prohibited from depicting animated forms, have been obliged to make the most of color on its own merits; color, consequently, is their principal decorative medium. Yellow or gold, blue, red, black, and white are their vehicles of art expression. All muddy compounds of hybrid tints, miscalled color in many modern pictures, are completely ignored. The only figures they employ are delicate arabasques, and patterns arranged in a capricious but still regular manner, and which, adapted to the eye in conformity with its sensuous aptitude challenge no criticism on the score of their non-resemblance to known natural objects. Gorgeous hues, therefore, in true complementary union, cover the spacious walls of this edifice; the eye wanders over them attentive to their innumerable harmonies as the ear listens to the infinite harmonies of musical sounds. Draped arches, festooned with divers tints, support blue panels decked with golden stars, while the stained glass windows, more like luminous interstices than anything else, pour in a flood of prismatic brilliancy to blend all together in soft and radiant light. The obscurities of the triforium, the sanctuary, the organ-loft, and other spaces, lend an air of mystery to the general tone, which is again enhanced by the dark reflections of the richly carved wood work. The general effect is one of subdued richness, an effect in harmony with a spirit of adoration, and with that instinct which leads man to exalt worship by art.

"The use of color in this building will attract all eyes to it, and make it a model for imitation far and wide. Mr. Eidlitz has used color elsewhere, and notably in St. George's Church, but nowhere on the same grand and effective scale as here Decorative motives generally consist of meaningless imitations of Renaissance ornaments, mouldings, panels and tracery bolstered up with artificial shadows, expressing no sentiment and symbolizing no truth. Color, as here employed, conforms to natural law, and is therefore a truth in itself. None of its combinations suggests the intellectual perversity associated with Renaissance symbols so conventionally applied to public and private edifices everywhere."

VENTILATION.

The *Journal of the Franklin Institute*, contains the first, or a part of the first of a second course of lectures on ventilation, delivered by Lewis W. Leeds, before the Franklin Institute during the winter of 1867-'68. There seems to be such an itching for scientific laurels at the present time, that the most common subjects, upon which all that is pertinent can be said plainly and briefly, are made the vehicles of professional display *ad nauseam*.

The subject of ventilation is an important one, and perhaps is not appreciated as it should be, or sufficiently provided for in either public or private edifices. Grant all that; but does it follow, that in order to cure the evil, long harangues upon the constitution of air, the physiology of respiration, the anatomy of the lungs, and the circulatory system, the diffusion of gases, and all the technical information in the remotest degree connected with the subject, should be aired in trying to convince people that unless they breath pure air their health will suffer? The first installment of these lectures treats of all the above-mentioned subjects, and more too. How much is to follow before the real gist of the subject shall be reached, we are unable to say. Perhaps a discussion of the respiratory apparatus of fishes and reptiles, with some accounts of toads which have been imbedded in rocks for nobody knows how many centuries, without breathing, and have emerged from their rocky prisons, "fresh as when in their pristine youth, etc," and hopped away without even thanking their deliverers. This might be made applicable to the subject of ventilation, as thus: The toad does not breath in the same way as man inhales the ambient air, consequently what is fun to them, would be death to you, my hearers. Moreover, all the stories of living toads, imbedded in rocks and trees, are humbugs—except the trees were hollow and the rocks had holes in them—from which we conclude that man could not breath without air, or live without breathing. *Quod erat demonstrandum.*

How to get the pure air is the question; a purely mechanical one. Hot air rises—cold air falls. The impure gases do the same thing; therefore it is only necessary to provide for the escape of foul gases at the bottom of a room, provided it is heated with warm air, or at the top, if heated by radiation; the pure air being admitted in the latter case through openings protected so that strong currents shall not be formed, and the exchange of air being fully provided for by passing the vitiated gases through heated flues, or drawing them off by fans or other apparatus.

There is the whole thing in a nutshell and all the scientific discussion of things upon the earth or under the earth can't make it more so; so the SCIENTIFIC AMERICAN believes and we believe its practical readers will concur.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING SEPTEMBER 15, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

82,058.—MORTISING CHISEL.—Otis Adams and James Hatch, San Francisco, Cal.

We claim making the lips beveled from the edge to the main part of the chisel, and with the ends beveled and inclined, as herein set forth.

82,059.—LAMP BURNER.—Thomas Adams, Hudson City, N. J., assignor to himself, J. L. Romer, and H. T. McCoun, Brooklyn, N. Y.

I claim, 1st, The flattened, cone shaped wick tube, A, provided with a triangular opening, f, for admission of air in front, as it were, of the single wick, to establish a current through the center of the flame, and constructed so that in the passage of the single flat wick through it in a straight line, or thereabouts, from below, said wick is made to assume an annular form at its exit from said tube, substantially as specified.

2d, The arrangement of the wick lifter or operating device, E, relatively to the straight or entering portion, e, of the tube A, constructed as described, and for operation in connection with the latter to turn and convert the wick from a flat or straight into a round or annular form, essentially as herein set forth.

3d, The base portion of the burner, of globular or enlarged character, as described, and divided, as at h (forming a cap, D), between the collar screw of the lamp and draft opening or openings to the flame, as and for the purpose herein set forth.

82,060.—CULTIVATOR.—A. H. Allison, Charlottesville, Ind.

I claim, 1st, The yoke, C, secured to the under side of the tongue, and provided with the adjusting blocks, g g, in combination with the beams, G G, uprights, f f, provided with adjusting holes, double tree, c, arms, c' c', and braces, connecting the ends of the yoke with the main frame, all constructed, arranged, and operated in the manner and for the purpose set forth.

2d, The beams, G G, hinged to the adjusting blocks, g g, and provided with the shanks, i i, and braces, h h, in combination with the bails, J J, and foot pieces, Z Z, all constructed, arranged, and operated as set forth.

82,061.—SCHOOL DESK.—Herbert L. Andrews, Chicago, Ill.

I claim, 1st, The standard, composed of two parts, A B, one provided with the projection, g, and axle, i, and the other with the flange, a, in combination with the arm, C, the standards being secured by the screws and nuts, all substantially as specified.

2d, The combination and arrangement of the recess, b, when filled with rubber, or other elastic material, standard, B, and projecting heel, h, of the arm C, substantially as and for the purposes specified.

82,062.—BLACKBOARD.—Herbert L. Andrews, Chicago, Ill.

I claim the blackboard, A, when provided with the groove, a, arms, c, pins or hooks, c, and supporting, constructed, and operating substantially as specified.

82,063.—LEATHER STRETCHING MACHINE.—W. R. Andrews, and Robert Dingwell, Newark, N. J.

We claim, 1st, The movable beam, B, in combination with the cross slat, C, when constructed and operated substantially as and for the purpose set forth.

2d, Operating the movable beam, B, by means of the ratchet bars, E E, and screws, D D, when constructed and arranged as specified, and for the purposes set forth.

82,064.—STOCK PUMP.—W. T. Armstrong, Freeland, Ill.

I claim the box pump, E, constructed as described, in combination with the stationary pipe, F, rod, D, and the compound hinged platform, B C, all constructed and arranged to operate substantially as shown and described.

82,065.—MOLDING PIPE.—John Aston, Pittsburg, assignor to William Smith, Allegheny City, Pa.

I claim, 1st, The combined arrangement of the flask, G, and hinged door G6, substantially as described.

2d, The pit, A, furnaces, B, with their flues, C, and outlets, Cc, ramming up stools, D, stoppers, E, nozzle, F, and sliding thimble, Ff, the bars, K, and slide plates, L, when combined and arranged substantially as herein described and for the purpose set forth.

3d, Drying pipe molds by means of passing currents of heated air or gases through them, without removing them from the pit in which the operations of molding and casting are carried on, substantially as described.

82,066.—JOURNAL BOX.—John E. Atwood, Mansfield, Conn., assignor to himself, A. Sprague, and W. Sprague, Providence, R. I.

I claim the annular ribs or collars, B*, near each end of the journal, in combination with the caps or shields, D, and the chambers, C*, provided in the journal box, all arranged substantially as herein set forth, for the purpose specified.

82,067.—SHINGLE MACHINE.—J. E. Austin Oswego, N. Y.

I claim, 1st, The method of operating the tilting tables, F F, namely, the projecting arms, f, obliquely slotted slide bars, H H, the hooking connecting rods, I I, and crank wheels, J having adjustable wrists or crank pins, all arranged and operating as herein shown and described, and for the purpose set forth.

2d, In connection with the tables, F, the laterally adjustable plate and socket block, N ll M, and vertically adjustable fulcrum block, K L, constructed and operating as herein shown, and for the purpose described.

3d, The bolt cutters, C C, having a horizontal movement on frame, D, and provided with wedges, s s, for acting on inclined surfaces of said frame, D, in such manner that all sides of the bolt holders are lifted alike, in connection with tappet lever, R, and link, P, or other suitable device for obtaining the sliding movement of bolt holders on frame, D, as and for the purpose described.

82,068.—WAGON AXLE.—C. D. Bachelder, Camden, Me.

I claim, 1st, The combination, with an axle provided with an oil recess, b, of the cap, g, arranged oil tight thereon, and provided with a slot for the wick, substantially as and for the purpose described.

2d, The recess, b, provided with the dividing rib, c, having a recess, d, for the wick, communicating with the recess, b, by the holes, e, substantially as and for the purpose set forth.

82,069.—WAGON JACK.—E. R. Baldwin, Southfield, Mass.

I claim the combination, with the bracket, B, and stand, A, of the friction rollers a and b, when applied and arranged as and for the purpose set forth.

82,070.—KNOB LATCH.—T. C. Ball, Bellows Falls, Vt.

I claim the combination of the lock ring, h, slots, c, and projections, k k, with and between the plates or escutcheon, b, and its projections, e and e', and the ring, g, with its slot, i, all operating together as and for the purpose set forth.

82,071.—ENAMEL FOR WINDOW-SHADES.—Edward C. Bancroft, Henry M. Bancroft, and Ed. H. Bancroft, Syracuse, N. Y.

We claim the employment of the within compound in the manufacture of cloth window shades, for the purpose described, substantially as set forth.

82,072.—ELASTIC DRAFT ATTACHMENT FOR SINGLE AND DOUBLE HARNESSES.—John Barron, Cincinnati, Ohio.

I claim the combination and arrangement of the india-rubber draft attachment, B, adjustable check strap, rods, or case, C, and coupling, G, substantially as and for the purpose herein specified.

82,073.—VISE.—Thomas L. Baylies and Edwin Crawley, Richmond, Ind.

We claim, 1st, The combination of the devices operating automatically, by which the action is changed from the adjusting to the compressing screw or screws, by a continuous turning of lever, a, in one direction, and the action of the screws is reversed by a continuous turning of said lever in the opposite direction, substantially as set forth.

2d, The combination of the pins, c and c', and slots, b and b', with the sleeve, G, and screws, F and E, substantially in the manner described and for the purpose set forth.

3d, The bowl, J, and trigger, H, in combination with the screw, E, adjusting screw, f, and sleeve, G, the latter being provided with a ratchet, as specified, and all operating substantially as described and for the purpose set forth.

82,074.—PLANE.—Valentin Bitsch, St. Louis, Mo.

I claim the combination of the bit, a, having its lower cutting edges to form a re-entering angle, with the open shank bit, a', having its lower cutting edges arranged with beveled corners, acting with the plane stock, A, to form blind slats, whose narrow edges are chamfered, substantially as set forth.

82,075.—FARM GATE.—Charles S. Bonney, Penn Yan, N. Y.

I claim the hinges, D E, when made and applied as specified, and used in combination with the gate, substantially as and for the purpose set forth.

82,076.—REFRIGERATOR.—Wilson Bray, Stockton, N. J.

I claim the forming or producing of a current of air within the provision chamber of a refrigerator, by means of a rotary fan or other mechanical device, so arranged as to impel or force the air through an ice box or water vessel surrounded by a freezing mixture, and also through a vessel containing charcoal or other absorbent of moisture and noxious gases, substantially as shown and described.

82,077.—MACHINE FOR FORMING EAVES-TROUGHS.—John Brett, Memphis, Mich.

I claim the eaves trough former constructed as herein described, of the grooved bed plate, A, crimping clamp, F, hinged thereto, with its hinged continuation, H I, and slotted roller, D, all arranged and constructed as herein shown and described.

82,078.—SAW SHARPENING DEVICE.—P. M. Bristol, Ludington, Mich.

I claim the swaging apparatus consisting of shaft C, wheel, D, and rest, E, arranged and combined substantially as described.

82,079.—MANUFACTURE OF ARTIFICIAL FUEL.—George H. Bronson, New York city.

I claim the process of making artificial fuel in which pitch or other similar material is used to produce the agglomeration of the articles of the substance or substances which consitute the basis of the fuel, by first heating the coal or other substance, and, while it is heated, introducing among it the pitch or other similar material in a powdered state, substantially as herein described.

82,080.—APPARATUS FOR DOMESTIC MANUFACTURE OF GAS.—John W. Brown, Wooster, Ohio.

I claim, 1st, The retort, D, in combination with a gas apparatus adapted to domestic use, and as described, constructed substantially as set forth.

2d, The arrangement whereby the apparatus is made self-regulating, by the pressure of the gas in the gas holder, substantially as shown and described.

3d, Using the surplus gas as fuel, either under the retort for generating gas, or for other purposes, by the automatic arrangement, substantially as described.

4th, In combination with a gas apparatus, the washer and tar receptacle, G, and purifier, K when the same are constructed and arranged substantially as described.

5th, The rake, l, in the retort, substantially as and for the purpose set forth.

82,081.—CHAIR SEAT.—E. L. Buckingham, Jefferson, Wis.

I claim the strips, b, composing the chair bottom, secured in the rails, A, by being passed over and under said rails, the ends being inserted in oblique slots, a, and there retained by the strip, C, applied to the outer edge of the rails, A, all substantially as herein shown and described.

82,082.—CARRIAGE SPRING.—Azro Buzzell, West Fairlee, Vt.

I claim my improved arrangement of the three springs A B C, as described, without any connection extending from or about from the middle of one spring, B, to or about to that of the spring, C, the whole being as shown in the drawings.

82,083.—LUBRICATING MATERIAL.—Calvin Carpenter, Jr., Astoria, N. Y., assignor to H. H. Wolcott, New York city.

I claim a lubricating material prepared from crude petroleum, in the manner above set forth.

82,084.—ANGULAR SHAFT COUPLING.—John M. Case, Worthington, Ohio.

I claim, 1st, Forming the bars, upon which the segmental cogs, E, are cast solid, substantially as herein shown and described and for the purpose set forth.

2d, Forming rims or flanges upon the sides of the segmental cogs, E, for the purpose of preventing their lateral movement, and relieving the side pressure upon the connecting bars, F, as herein shown and described.

82,085.—WRENCH.—Luke Chapman, Collinsville, Conn.

I claim the combination with the jaw A, provided with the recess, B, and annular groove, C, of the nut, D, and the spring ring, E, substantially as and for the purpose set forth.

82,086.—CAR WHEEL AND FROG.—W. H. Childe, Gainesville, Ala.

I claim uniting railroads of different gages by means of a frog applied at the junction of two or more tracks, and constructed as described, and by railroad wheels constructed with two or more independent treads, the said frog and wheels being employed together, but one former also permitting wheels with a single tread to pass over it, all substantially as described.

82,087.—MEASURING FUNNEL.—Charles Chinnock, Brooklyn, N. Y.

I claim the arrangement within the funnel of the stem, B, carrying the valve, C, at its lower end, whereby the weight of the funnel closes the valve when the latter is suspended by the stem for filling, substantially as herein set forth.

82,088.—FEED BAG.—Charles Chinnock, Brooklyn, N. Y., assignor to J. Little Hyde, New York city.

I claim the combination of the endless cord, c, and pulleys or slides, b, with the feed bag, A, all arranged and operating essentially as set forth.

82,089.—CULTIVATOR.—Joseph H. Clifton, Newcastle, Pa.

I claim, 1st, The board, A, provided with the knives, a, etc., and teeth, b, as and for the purpose set forth.

2d, The board, A, in combination with the bar, c, and teeth, c', as and for the purpose set forth.

82,090.—SHUTTLE.—Nathan Clough, Lowell, Mass., and James Baldwin, Manchester, N. H.

We claim a shuttle having its tip-shank riveted to the wooden plug, and the plug secured in the shuttle, as herein described.

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82,091.—BUCKLE.—James Cory, Wayne, Mich.

I claim the arrangement of the tongue, C, and cross bar, B, in connection with the bails, A, in such a manner that each tongue shall operate on its bail without any intermediate bar, substantially as and for the purposes set forth.

82,092.—SEED COVERER.—E. D. Cramer, Hackettstown, N.J.

I claim a pointed seed coverer consisting of a triangular frame, A B, and of the up-and-down adjustable plates, D D, all made and operating substantially as herein shown and described.

82,093.—FORGING APPARATUS.—David Davies, Crumlin, England.

I claim, 1st, The steam cylinder and piston, connected with the hammer arm, so as to operate the same, in combination with the horizontal cylinder, arranged so that it can be turned, and in which the steam cylinder is mounted, substantially as described, so that the direction of the blows, relatively to the face of the anvil, can be changed.

2d, The steam cylinder and piston, connected with the hammer arm, so as to operate the same, and mounted in the horizontal cylinder, arranged so that it can be turned, to change the direction of the blows, relatively to the face of the anvil, substantially as described, in combination with the hydraulic ram, for raising and lowering the same, to adapt it to articles of various thicknesses or hight, substantially as described.

3d, Connecting the horizontal cylinder with its base, so that it can be turned in a horizontal plane, in combination with the steam cylinder and piston connected with the hammer, substantially as and for the purpose described.

82,094.—MOLDING BELL.—W. H. Davis, Brooklyn, N. Y.

I claim, 1st, The arrangement on the outer casing, B, of a downwardly projecting lip or rim, b, corresponding in size and position to the upwardly projecting rim or lip, a, on the inner casing, A, substantially as and for the purpose described.

2d, The arrangement of a guide for the sweep, D or D', on the rim of each casing, in addition to the central guide pin, d, substantially as and for the purpose set forth.

3d, The arrangement of two bearing points on the guide, F, substantially as and for the purpose set forth.

4th, The additional guide, G, catching over a rim, k, on the casing, in combination with the guide, F, substantially as and for the purpose described.

5th, The shank of the jaw, E, fitting into a socket in the guide, F, and allowing said jaw to accommodate itself to the position of the sweep, substantially as described.

82,095.—VISE.—Fernando J. Dibble, Chicago, Ill.

I claim, 1st, The combination and arrangement of the jaws, E D, the standard, C, and socket, B, provided with a set screw or its equivalent, the whole operating in the manner and for the purposes set forth.

2d, The combination of the jaws, E D, slide, H, screw, F, standard, C, and socket, B, arranged and operating in the manner and for the purposes described.

82,096.—BORING AND MORTISING MACHINE.—J. Jacob Earley, Fairfield, Ohio.

I claim, 1st, The adjustable chisels, 1 I, springs, N, cams, O, and wheel, G, when arranged and operated, in combination with the auger, H, for the purpose specified.

2d, The circular stays, L, adjustable radial arms, M, for expanding and contracting the shanks of the chisels, in the manner set forth.

82,097.—SAFETY ATTACHMENT TO WATCH.—Julius Elson (assignor to Florentine A. Jones), Boston, Mass.

I claim, 1st, The spring, D, provided with a stud or projection, d, one or more, in combination with the perforated barrel, as and for the purpose specified.

2d, The spring, D, in combination with the main spring, for the purpose of equalizing the tension of the latter, as set forth.

3d, The stud or projection, d, in combination with the barrel or main spring, when used and operating substantially as and for the purposes set forth.

82,098.—CHIMNEY TOP.—Henry English, Wilmington, Del.

I claim the construction of chimney tops, with one or more apertures at the base and upper portion, constructed and arranged as hereinbefore described for the purpose set forth.

82,099.—CHAMBER COMMODE.—Enoch S. Farson, Philadelphia Pa. Antedated September 1, 1868.

I claim the spring catch bar, E, in combination with the cover, D, pot, C, and adjusting handle, F, the said spring catch bar and handle being constructed and arranged to operate together substantially as and for the purpose described.

82,100.—MACHINE FOR STUFFING HORSE COLLARS.—William Fauntleroy, New Harmony, Ind.

I claim, 1st, The combination of the collar board, B, pulley, E, collar, I, and mandrel, K, substantially as and for the purpose described.

2d, The combination with the same, of the belt, F, and treadle, G, substantially as and for the purpose described.

82,101.—BEEHIVE.—Orrin Field, Independence, Iowa.

I claim the combination with the central fixed comb frame, B, of the detachable hinged comb frames, C, all arranged substantially as herein shown and described, for the purpose specified.

82,102.—PAVEMENT.—Richard Foley (assignor to himself and Edwin Ferguson), New York city.

I claim the combination, in a pavement, of the foundation boxes, a, filled with concrete, with the surface blocks, b, and strips, c, being laid in alternation, substantially as and for the purpose described.

82,103.—DEVICE FOR PRESSING, PACKING, AND WEIGHING WOOL.—A. W. Fox, Columbiaville, Mich.

I claim the weighing device, consisting of the circular plate, i, rod, p, hinged bar, j, tube, m, spring, l, and lever, L, in combination with the hinged parts, B B C C, and fixed part, D, of the packer, as herein described, for the purpose specified.

82,104.—PERMUTATION LOCK.—Cicero R. C. French, Berkley, Mass.

I claim, 1st, The combination, with a series of tumblers and adjustable rings, of an indicating wheel, O, a click, P, and sliding plate, C, whereby the bolt being set at half lock, the required combination may be formed, by turning the tumblers alternately in opposite directions, substantially as set forth.

2d, The curved recesses in the bolt, B, in combination with the sliding plate, C, when operating as and for the purpose specified.

3d, The click or bolt, P, provided with the projection, i, in combination with the bolt, B, as set forth.

82,105.—LIQUID METER.—Charles A. Geissenhainer, and George W. Geissenhainer, Pittsburg, Pa.

We claim the arrangement, in the air tight glass chamber, A, constructed as herein described, of the straight bucket wheel, B, water chamber, C, pipes, D E, cog wheels, B, and indicating devices, g, all constructed as and for the purposes set forth.

82,106.—MANUFACTURE OF BEET SUGAR.—Theodore Gennert, New York city.

I claim, 1st, Treating beet sugar with cane sirup or cane molasses, substantially as and for the purpose described.

2d, Treating beet sugar with cane sirup or cane molasses, under the application of heat, substantially as and for the purpose set forth.

3d, Exposing the beet sugar to the action of water or steam, after the same has been treated with cane sirup and molasses, substantially as and for the purpose described.

82,107.—MILL PICK.—H. H. Gillett, Warsaw, Mo.

I claim a mill pick handle, constructed as described, and provided with glass, enabling the operator to see his work, as well as shielding him from any particles of rock flying about, as herein set forth.

82,108.—CUPBOARD CATCH.—P. D. F. Goewey, Albany, N. Y.

I claim the latch, composed of the plate, A, the locking tumbler, D, in combination with and operated by the doubly-moving knob, C, all constructed substantially as herein shown and described, and for the purposes specified.

82,109.—ROCK-DRILLING MACHINE.—Ernst W. Gram, Negaunee, Mich., assignor to himself, Peter Berg, and A. P. Swineford.

I claim the combination of the stationary frame, A B, oscillating frame, C, trunnions, D, shaft, E, pinions, F G H, shaft, I, lifters, J, rod, K, wiper-lifter, L, spring, N, drill, O, cam, P, plate wheel, Q, spring R, and shoulder, S, all constructed and arranged substantially as herein described.

81,110.—LUBRICATING PULLEY.—James H. Gray, Boston, Mass. Antedated September 8, 1868.

I claim an oiling device for loose pulleys, when constructed, applied, and arranged to operate substantially as and for the purpose described.

82,111.—LIFTING JACK.—William Green, Holly, Mich. Antedated September 7, 1868.

I claim, 1st, The movable pedestal, B, when used in combination with a "lifting jack," the parts being constructed and arranged as and for the purpose specified.

2d, The arrangement of the springs, m m and j, with the lever, C, catch dogs, f f and h, the several parts being used as and for the purposes herein set forth.

82,112.—GATE.—William W. Green, Jr., Janesville, Wis.

I claim, 1st, The combination of the yoke, h k i, and guard, g, so as to allow the gate to be removed, when required, and yet prevent it from being removed by unruly animals, substantially as described.

2d, The combination of the elongated rail and cap, b a, bonnet, d, spur, e, yoke, h k i, wedge, n, and block, l', substantially as described.

82,113.—MACHINE FOR PLANING AND MOLDING.—J. P. Grosvenor, Lowell, Mass.

I claim, 1st, The combination of the swinging mandrel frame with the vertically-adjusted slide, E, and laterally adjustable slide, I, substantially as described for the purpose specified.

2d, The pattern, constructed as described, with a rebated outer edge, in combination with the perforated rigid or flexible rack, r, substantially as described for the purpose specified.

3d, The rigid or flexible rack, r, constructed as described, and adapted to be applied to a pattern to be used in cutting irregular forms, substantially as herein shown and described.

4th, The pattern, Q, provided with a rack, r, around its outer edge, to assist the process of feeding the wood to the cutter head.

5th, The feed wheel, R R', when constructed of the two parts, R R', so as to operate, in connection with a pattern having a rebated outer edge, in the manner described.

82,114.—CLOTHES PIN.—John Haigney and Frank M. Hedman, East Boston, Mass.

We claim the combination and arrangement of the brace, D, and the catch-spring, F, with the two levers, A B, connected together in manner and so as to operate substantially as described.

Also, the arrangement and combination of the auxiliary spring, E, with the brace, D, the catch spring, F, and the two levers, A B, arranged and combined substantially as explained.

82,115.—WINDOW SCREEN.—Frank Hatch, La Crosse, Wis.

I claim the combination of the two sections or frames, A B, with a spring, d, so arranged that the spring will operate to force said sections outward against the window casing, and retain the screen in any desired position, substantially as and for the purpose described.

82,116.—BRICK MACHINE.—Daniel Hess, Blandville, Ky.

I claim, 1st, The arrangement of a centrally-poised beam B with its weighted box, A, oscillated by the arms, J, and connecting rod, K, in combination with the plungers, P, substantially in the manner and for the purpose specified.

2d, In combination with my oscillating box, A B, the plungers, P, with their enlarged base, p p, and slots, 1 2 3 etc., when operated substantially in the manner set forth.

3d, The arrangement of the press bed, G, and table, E, in combination with the revolving mold tables, F, between them, together with the molds, f, for pressing bricks edgewise, when arranged substantially as set forth.

4th, The arrangement of the table, E, with its hopper openings, 3, in combination with the revolving mold beds, F, and molds, 1 2 3, arranged in the manner and for the purpose specified.

82,117.—COUPLING.—John Heuermann, Davenport, Iowa.

I claim, 1st, The arrangement and combination of such coupling as is shown in drawings, and described in the specifications.

2d, The construction of slots extending about two-thirds of the distance from bottom to top or outer end in coupling case, as shown on drawings.

3d, The construction of openings in double cross sockets, for oval bolts.

82,118.—SCREW-CUTTING DIE.—Arnold Hoermann, New York city. Antedated September 4, 1868.

I claim, 1st, A screw-cutting die, having a recessed surface, so as to present two or more cutting threads in full sectional relief, as described and shown.

2d, The die, C, having a recessed surface, so as to present two or more cutting threads in full sectional relief, combined with the slot, C', set in advance of the center of the die, all as set forth.

3d, The guide, M, in combination with a die having portions of one or more threads entirely removed from the entering face thereof, the several parts being constructed and arranged substantially as and for the purpose herein set forth.

82,119.—FLOOR COVERING.—Wm. Howell, J. C. Finn, and C. A. Duy, Philadelphia, Pa.

We claim a covering for floors, etc., consisting of layers of cloth, paper, and wood, combined as set forth.

82,120.—COMPOSITION FOR SIZING AND DRESSING WARPS.—Thomas Johnson, Tewksbury, assignor to himself and J. H. Hutchinson, Lawrence, Mass.

I claim the above described composition, as composed of the before-mentioned ingredients, combined by means of water and heat, in manner substantially as described.

82,121.—EXTRACTING TAN BARK.—T. W. Johnson, New York city.

I claim, 1st, The within described process of extracting tan bark by softening the bark in chips, passing it through rollers into the saturating tank, exposing it in said tank to the action of beaters, elevating and passing it through a series of leaches, where it is washed repeatedly until all the astringent properties contained therein are taken up by the wash, substantially as set forth.

2d, Passing a constantly fresh supply of crushed bark through the saturating tank, and exposing it therein to the action of beaters, substantially as and for the purpose described.

3d, Separating the disintegrated bark from the liquid absorbed by it while passing through the saturating tank, by the action of the perforated buckets on the elevator, and by that of the leach which receives the bark as the same is discharged from said elevator, the liquid absorbed by the disintegrated bark being drained off by the perforated elevator buckets, and by the perforated bottom of the receiving leach, and returned to the saturating tank, substantially as set forth.

82,122.—COMPOSITION FOR MAKING DESIGNS UPON FABRICS.—Mrs. R. L. Jones, Sacramento, Cal. Antedated May 6, 1868.

I claim the composition of rosin and soot, perfumed as above described, and for the purpose set forth.

82,123.—HEMP BRAKE.—John Kaye, Louisville, Ky.

I claim the combination of the cranks and beaters, when constructed and operating substantially in the manner and for the purpose herein described.

82,124.—DEVICE FOR BLOCKING CHAINS.—Peter Kendrick, Trenton, N. J.

I claim the box, A, provided with the movable partition, C, and screws, P, in combination with the strips, a a', at the ends of the bottom, a x, of the box, for supporting the long links, D, at the ends of the box, substantially as and for the purpose specified.

82,125.—INVALID REST.—T. S. Kennard, Exeter, N. H.

I claim the combination of the brace, A, which supports the back of the rest, B, at different angles, and secured by the thumb screw in the socket, C, and at the lower end by the hinge, D, with the card teeth, E E, on the under side of the rest, to prevent its sliding or slipping on the bed when in use, in the manner described.

82,126.—OSCILLATING STEAM ENGINE.—R. J. King, Lancaster, Pa.

I claim, 1st, The arrangement of the connecting rod, A, with its slot, C, and regulating devices, D E and F, with the rock shaft, G, and eccentric, S, as herein described.

2d, The arrangement of the eccentric, S, with reference to the parts, A C D and F, and the shaft, T, as herein set forth.

3d, The arrangement of the angular pipes, M and R, with the steam chest, N and the trunnions, P, as herein set forth.

82,127.—ADJUSTABLE CARRIAGE POLE.—M. A. Koon, Catskill, N. Y.

I claim, 1st, Making the extension, B, through which the arms, C C', of the swinging braces, D D', pass, separate from the pole itself, substantially as herein shown and described.

2d, The arms, C C, constructed as described, and attached directly in the pole extension by means of a horizontal aperture fitted through, and a screw, a, fitted into the same, as set forth.

3d, Making the contiguous surfaces of the arms, C C', rough or toothed, as set forth, and forming indentations, b b, or their equivalents, on the outer face of one of them, substantially as and for the purpose herein shown and described.

82,128.—LIFTING MACHINE.—A. Kriebel, Hereford, Pa.

I claim the combination of the slotted perforated post, A, two pins, B, lever, C, and chain, D, with each other, said parts being constructed, arranged, and operating substantially as herein shown and described, and for the purpose set forth.

82,129.—ANILINE DYE.—J. Lambert, Jr., (assignor to himself and Charles Rumpff,) New York city.

I claim, 1st, The new product or coloring material above described, called by me saffranine red.

2d, The process employed by me for producing the said coloring material, saffranine red, substantially as above described.

82,130.—PLOW AND CULTIVATOR.—John Lane, Chicago, Ill.

I claim the improvement herein described in the manufacture of plows and cultivators, that is to say, the making of them of metal plates, having a central layer of soft iron or steel, with exterior layers of cast steel, substantially as and for the purposes described.

82,131.—CENTERING DEVICE.—E. E. Lazell (assignor to himself, T. H. Peters, and F. Keyser), Philadelphia, Pa.

I claim the arrangement, with the concave conical milling head, D, of the centering pin, E, projecting through the head, D, in the manner and for the purpose herein specified.

82,132.—BAG-HOLDING DEVICE AND TRUCK.—J. S. Lehman, Mount Joy, Pa.

I claim the holder, C, constructed as described, and having a short angle, W, with beveled sides, so as to fit into dovetailed slots in the jaws, B, all arranged and operated substantially as specified and shown.

82,133.—OUT-HAUL FOR BOOMS.—George W. Leighton, and C. O. Cole, Portland, Me.

We claim the combination and arrangement of the rack, b, and vessel's boom, dog, B, ring, f, and loop, e, or their equivalents, as and for the purposes set forth.

82,134.—PLAYING CARDS.—John J. Levy, New York city.

I claim as new articles of manufacture, playing cards provided with beveled edges, substantially as herein shown and described, and for the purpose set forth.

82,135.—DEVICE FOR CONDUCTING GRAIN TO THRESHING MACHINE.—A. W. Lockhart, Sacramento, Cal.

I claim the employment or use of a plurality of endless aprons, H K K, connected with a frame, F, and an adjustable upright pole, A, all arranged in such a manner, that the aprons may be adjusted at different degrees of inclination in order to feed grain from stacks or wagons to threshing machines, and the pole rendered capable of always being adjusted in a vertical position, even when placed on uneven or inclined ground, substantially as and for the purposes herein set forth.

82,136.—CHIMNEY SCRAPER.—Shubael K. Luce (assignor to himself and Charles O. Luce), Marion, Mass.

I claim a scraper, composed of the bars, I I I I, with slots, i i i i, the bars, H H H H, with bolts, h h i h h h h h, and the corner bolts, L L L L, connected by the expanding springs, J J J J J J J J, the collars, K K, on the shaft, F, the whole being constructed and operating in the manner and for the purpose herein described and set forth.

82,137.—COMBINED CORN PLANTER AND CULTIVATOR.—John S. Mason, Coal Run, Ohio.

I claim the plow beams, K K, attached to the frame, A, by joints, j, in connection with the standards, h, and covering plates, i x, crank shaft, L, to the cranks, k, of which the beams are connected by chains, and the lever, M, at one end of the shaft, L, substantially as and for the purpose specified.

82,138.—LIQUID METER.—Joshua Mason, Paterson, N. J.

I claim, 1st, The combination, with the measuring cylinder, A, and its reciprocating piston, B, of primary and secondary valves, K and P, when arranged for operation in relation to the measuring cylinder, substantially as shown and described.

2d, The primary and secondary valves, K and P, formed with disks or heads, j j' k k', and n n' r r', for operation within valve chambers, F F', in combination with ports and passages, f f', i i', inlet passages, g, branch, e, passage way, H, ports, s s', and passage, G, with its opening, d, essentially as specified.

3d, The arrangement of the ports or passages which control the ingress and egress of liquid through the secondary valve, and of the passages in connection therewith in such manner as that the flow of the liquid through the valve acts on the latter in the same direction as that to which it has been last shot, and so that said valve is kept shot or thrown in opposite or reverse positions by the pressure of the fluid on its opposite heads alternately, substantially as herein set forth.

4th, The primary valve, K, operated by the piston of the measuring cylinder, essentially as described, and having an open tubular stem in open communication with the latter, as and for the purpose specified.

82,139.—PRESS.—George Matthewman, Brooklyn, N. Y.

I claim operating the press through the instrumentality of two toggles arranged as represented, that is to say, the arm, I, operating the arm, F, through the link, H, presenting the several angular relations at the different periods, as specified, and the motion thus transmitted being conveyed to the press-rod, b, and its connections, through the medium of the arms, E, and links, D, forming a second toggle, all substantially as and for the purposes herein set forth.

82,140.—SULKY PLOW.—J. R. McConnell, Marengo, Iowa.

I claim, 1st, The construction and arrangement of the pivoted draft pole K, adjustable side bar, E, beam, A, and lever, L, as herein described for the purpose specified.

2d, The adjustable right angular bar, E, seed bar, I, adjustable bar, J, brace, G, and lever, L, in combination with the beam, A, pivoted draft pole, K, and plow, C, all arranged as described, for the purpose specified.

3d, The adjustable right angular bar, E, adapted to support the seat and bar, H I, the bar, J, brace, G, and pivoted draft pole, K, as herein described for the purpose specified.

82,141.—HARVESTER RAKE.—Leander J. McCormick, William R. Baker, and Lambert Erpelding (assignors to C. H. McCormick and Brother), Chicago, Ill.

We claim, 1st, The combination in a harvester, substantially as set forth, of a hinged finger beam, a narrow platform affixed to the finger beam, and a dropping platform hinged to the fixed one, with a series of steel-ribs, and a rake revolving over the platform on a horizontal shaft, and mounted on a support secured on the shoe.

2d, The combination, substantially as set forth, with the tripping cam, of the vibrating arm, U, and oscillating dog, for the purposes set forth.

82,142.—HAMES FASTENER.—Robert R. McDonald, Syracuse, N. Y.

I claim the frame, A, the teeth, B B, the catches, C C, the thumb-screw, D, the spring, E, and tongue, when the parts are constructed, combined, and used in the manner as set forth and described.

82,143.—TENONING MACHING.—William McKnight (assignor to himself, John H. Fulford, and Daniel W. McCurdy), Clearfield, Pa.

I claim the arrangement of the guide, C, rest plates, a, adjustable rest, b, and sliding rest, d, upon the bed, to operate in connection with a plane, as herein shown and described.

82,144.—TOBACCO DRESSING MACHINE.—Robert Meginnity and Joseph Dessenger, Detroit, Mich.

We claim, 1st, The loosening of the fibers of fine cut tobacco by a blast of air passing through the same.

2d, The oscillating cylinder, F, provided with the rock shaft, D, the inclined longitudinal screens, O O, the perforated tweer plate, N, the openings S and P, the doors, Q, bumper springs, R, stirrup, T, and step, V, when arranged and operating in the manner described, and for the purposes set forth.

3d, The fan blower, B, driving shaft, D, pulley, C, crank, E, connecting rod, G, and rocker arm, H, the air-conducting pipe, J, oscillating tweer, K, trunnion, U, and blast pipes, M, when arranged and operating substantially as described, for the purpose specified.

4th, The combination and arrangement of the above-named parts with the frame, A, substantially as and for the purposes set forth.

82,145.—CARVING MACHINE.—George Merrill, Newburyport, Mass.

I claim, 1st, The combination, in a machine constructed substantially as described, of the laterally-swinging arms, D, and the vertically-sliding tool and guide holder, u, when said parts are arranged to operate substantially as and for the purpose set forth.

2d, The combination of the swinging frame and the sliding plate or frame, u, carrying the cutting tool and guide, arranged with sliding table, B, to operate in connection therewith, substantially as described.

3d, The combination of the adjustable frame, H, hinged bars, D, frame, T, having the pulley, I, mounted thereon, and the sliding plate or frame, u, when arranged to operate as set forth.

82,146.—STEAM GENERATOR.—T. H. Muller, New York city.

I claim, 1st, The construction of the diaphragms, G, extending in a longitudinal direction through the tunes, B, substantially as described.

2d, The construction of the flanges, b, at the ends of the diaphragms, G, substantially as set forth.

82,147.—CORSET.—William W. Netterfield, Rochester, N. Y.

I claim the arrangement of the stiffeners, h i k, springs, c c, diagonal shoulder braces, l l, straps, a a, back stiffeners, b b, hooks or buckles, m m, and side spring stiffeners, f f, all as herein described and for the purpose set forth.

82,148.—CORN HARVESTER.—Nelson Newman, Springfield, Ill.

I claim the yielding bars, H, applied to the machine as shown, or in an equivalent way, to operate in connection with the teeth or cutters, e, and fingers, c, substantially as and for the purpose set forth.

82,149.—ROTARY STEAM ENGINE.—Thomas A. Nizer, Hamilton, Ohio.

I claim, 1st, The arrangement of the cylinders, k k, piston, J J, steam pipes, L F, lever arrangement and cock, m, double abutments, E, and partition plate, h, with relation to each other and the inclined planes, C, as herein shown and described.

2d, The adjustable packing plate, a, adapted to conform to the curve, O, of the inclined planes, C, as herein shown and described.

82,150.—LAMP.—John E. Noyes, New Albany, Ind.

I claim, 1st, The lamp, B, provided with tube, C, hollow shaft, f, with opening, i, and screw regulator, g, substantially as and for the purposes set forth.

2d, The triangular, plate, formed into a wick tube, F, with the projecting edges of the wick, in the manner set forth, and used with the lamp, B, as constructed, as and for the purposes set forth.

82,151.—ILLUMINATING OIL.—John E. Noyes, New Albany, Ind.

I claim the within-described burning fluid, compounded and prepared substantially as set forth.

82,152.—HAY KNIFE.—James Offineer, Ashland, Ohio.

I claim the knives, A B C and D, attached to the iron strip, H, when arranged and combined as herein described, for the purpose set forth.

82,153.—SEED PLANTER.—R. F. Osgood, Rochester, N. Y.

I claim, 1st, So combining and arranging the feeding apparatus, consisting of hoppers, E, rollers, G, and drill teeth, H, with the shaft, I, that the lateral adjustment to change the width of the rows shall be effected by simply sliding in the straight continuous shaft, as herein set forth.

2d, Combining with the swinging gate, and with the seeding apparatus mounted thereon, the adjusting screws, k k, or equivalent, whereby the depth of cut of the drill teeth may be increased or lessened, as set forth.

3d, The combination of the gear bar, L, and the swinging gate, D, of the arm, q, so arranged that the gate is allowed a range of motion sufficient to adjust the depth of cut of the drill teeth, before the gear is raised to be disengaged, as herein set forth.

81,154.—PROCESS OF PREPARING SULPHATE OF BARYTES.—William M. Page and Emil B. Krausse, St. Louis, Mo.

We claim the process, substantially as described, for heating sulphate of baryta, and producing therefrom the refined product known to the trade as "sulphate of barytes."

82,155.—CORN PLANTER.—G. F. Partridge, Adrian, Mich.

I claim, 1st, The hopper, H, horizontal and perpendicular spout, I, slide, K, valve, L, lever, N, connecting rod, O, bell crank, P, arms, S, levers, T, all being operated by the projections, F, upon the sides of the wheel, D, when constructed and arranged substantially as herein set forth.

2d, The lever, W, rod, X, bars, Y, in connection with the bends, Z, pole, 3, hounds, 4, and rod, 5, when operating substantially as and for the purpose herein described.

3d, The combination and arrangement of the above named parts with wheels A and D, axle, B, frame, C, parallel bars, E, front bar, G, standard, 6, cultivator teeth, 7, scraper, 8, lugs, 9, when constructed, arranged, and operating substantially as and for the purposes herein specified.

82,156.—HARVESTER.—Everett G. Passmore, Jr., Philadelphia, Pa.

I claim, 1st, The combination, substantially as set forth, of the main frame, the driving wheel, the finger beam, arranged in the same vertical plane as the main axle, but on a lower level, the vertically-moving pivoted tongue, the adjusting crank, and the hand lever, J, whereby the guards may be tipped at the will of the operator.

2d, The combination, substantially as set forth, of the independently-hinged combined reel and rake arms, the double-tracked cam, and the vertically-adjustable guide arms, whereby the beaters are caused to descend into the standing grain in advance of the cutters, and to rise before reaching the cutters, as set forth.

3d, The combination, as set forth, of the rake arm, guide, and cam way, s, with the spring latch, u, which is lowered to lift the rake, and the latch, s2, which falls to guide it back to the track, whereby the gravel is always removed unless the rake is lifted by the latch.

4th, The combination, in a harvester, substantially as set forth, of a series of independently hinged rotating rake and reel arms with the double tracked cam-way and connecting guides, when so arranged that the rake descends upon the platform behind the cutters, to sweep off the gavel, while the beaters descend into the grain in advance of the cutters, and rise before reaching them, to lift fallen grain.

82,157.—PLOW.—Ezra Peck, Chicago, Ill.

I claim, 1st, A hollow sheet metal beam, when constructed with the flanges, E E, as set forth and for the purpose specified.

2d, Constructing a hollow plow beam by riveting or otherwise properly fastening together the two parts, A and K, or their equivalent, for the purpose specified.

3d, Constructing a hollow plow standard and beam, curved and bent in one continuous piece, directly from sheet metal, in the manner and for the purpose specified, as a new article of manufacture.

4th, The slotted concave support, in combination with the beam, A, and mold board, z, all arranged as set forth.

5th, Rounding or angling the inner bearing or face of the coulter standard, u, when used in connection with the clasp, j, in the manner and for the purpose specified.

6th, The beam, A, strip, K, flanges, E E, slotted support, o, and mold board, z, all constructed and arranged as set forth.

82,158.—SMOKE STACK.—Theodore P. Peck, Savannah, Ga.

I claim, 1st, The cone box, B, having perforated upper section, with bonneted outlets or port holes, c', substantially as herein described.

2d, The inverted truncated cone shaped sieve, F, arranged within the perforated upper section of the cone box, B, substantially as and for the purpose herein set forth.

3d, The combination of the cone box, B, and sieve, F, with each other and with the other parts of a smoke stack, substantially as herein specified.

82,159.—METALLIC SHUTTER.—Eliab Perkins, Fond du Lac, Wis.

I claim, 1st, A metal shutter, formed of two plates recessed and riveted together, in the manner substantially as described.

2d, A metallic shutter, constructed substantially as herein described, and provided with a water reservoir, substantially as set forth.

82,160.—FURNACE FOR MELTING STEEL, IRON, ETC.—Edward R. Playle, Great Bend, Pa.

I claim the furnace, A, when suspended on trunnions with power gear attached, for the purpose herein described.

82,161.—STOP-COCK.—Joshua Regester, Baltimore, Md.

I claim, 1st, The valve, F, constructed with a flange, i, and embraced by an elastic packing, h, which is applied between the collar and cap of the stop-cock, substantially as described.

2d, A right-and-left screw valve stem, D D', a valve, F, and the picking, h, combined and adapted to operate substantially as described.

82,162.—CORN-PLANTER.—James Selby, Peoria, Ill.

I claim, 1st, The combination, with the slide, C, of the roller, h, and arm or support, D when arranged to operate substantially as described

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2d, The lever, L, having its lower end resting in a socket or rest connected to the seed slide, for the purpose of holding the slide down while operating it, as set forth.

3d, The seed-tube, B, provided with the vertical partition, l, and horizontal partition, f, with the holes, o, therein, substantially as described.

4th, The valve-rod, b', with the valve, n, attached thereto, said rod, b', being located in the seed tube, B, and operated by the slide, C, substantially as shown and described.

82,163.—HOWEL AND CROZE.—Jacob B. Siefried, Pittsburg, Pa.

I claim, 1st, In the case of a howel, or of a howel and croze, the opposite working faces, a a', made substantially as described, and either with or without the flat face, a'', for the purpose set forth.

2d, A howeling bit, c, made with two or more curved edges, x x', to correspond to the shape of the working edges, a a', of a howel-case, substantially as above described.

3d, The construction of a combined howel and croze, the cutting bits of the croze being placed at or a little forward of the centre of the working face of the howel, and the howeling bit just back of the centre, substantially as and for the purposes set forth.

4th, The frame, f, as a box or case for the crozing chisels, hung in the combined tool by a ball-and-socket or hinge joint, or other equivalent device, and operated substantially as and for the purposes above set forth.

82,164.—APPARATUS FOR IMPREGNATING CANE JUICE AND OTHER LIQUIDS WITH SULPHUROUS-ACID GAS.—Evan Skelly, Plaquemine, La.

I claim, 1st, The register, K and valve J, in connection with the wheel, O, and pendent valve, L, all arranged as shown, or in an equivalent way, to admit of the supply of gas to the cane juice being automatically regulated by the quantity of juice passing through the juice trough, substantially as set forth.

2d, The wheel, O, in the juice trough, M, in combination with the pendent partition plates, N N, and recesses, e e, all arranged as shown, for the mixing of the gas with the cane juice, and the prevention of the escape of gas from the juice trough, substantially as shown and described.

3d, The wheel, F, provided with the draught nozzles, a, and submerged in the chamber, E, in combination with the pipes, B B' B'', and furnace A, all constructed and arranged as shown, for the purpose of drawing the gas from the chamber through the water in E, substantially as set forth.

82,165.—GANG PLOW.—Frederick P. Smith, Petaluma, Cal.

I claim, 1st, The arrangement of the devices and means herein recited for raising and lowering the frame and plows.

2d, The bars, with spaces on the end of the beam, and on the tongue, with the bolts and nuts for the adjustment of the land wheel axle, and the caster wheel's arm, as herein set forth.

82,166.—GANG PLOW.—F. P. Smith, Petaluma, Cal.

I claim the combination of the several means and devices herein set forth, for raising and lowering the plows.

82,167.—TWINE BOX.—H. Smith and J. Emery, Buffalo, N.Y.

We claim, 1st, The adjustable and removable knife, B, having a screw shank, C, and set screw, C', in combination with the twine box, A, substantially as described.

2d, The extended screw shank, C, and set screw, C', as a means of connecting and securing both the knife, B, and removable bottom, D, to the main body of the twine box, A, substantially as herein described.

82,168.—HAME.—Isaac B. Smith and Henry C. Burr, Springfield, Vt.

We claim, 1st, The combination of the post, A, double post, B, and blot, E, arranged and constructed substantially as and for the purpose described.

2d, In combination with the bolt, E, the washers, J and K, arranged upon it, substantially as set forth.

82,169.—COAL STOVE.—H. D. Snyder, Carbondale, Pa.

I claim a stove composed essentially of the wall, A, formed of the system of doors, as above described, the grate, D, supported as described, the cylinders, C and G, the upright shaft, I, the centering plate, i, and the radiating box, J, all the said parts being constructed and put together as described.

82,170.—GRAIN DRYER.—Henry Spendelow and Rob't Henenage, Buffalo, N.Y.

We claim, 1st, The arrangement, in combination with the closed chambers, of the disk plates, k, and raised flanges, h, in the manner and for the purpose herein set forth.

2d, The combination, with the arms, l l, of the spreaders, p p p, arranged as described, and operating in the manner and for the purpose specified.

3d, The arrangement, in combination with the drying floors, C, and arms, l l, of the series of slots, m m, receding in position, so as to leave a closed surface in the succeeding floor below each slot, as herein set forth.

82,171.—GUIDE FOR SCROLL SAW.—G. W. Staats, Newcastle, Pa.

I claim, 1st, The guide, A a, substantially as described, in combination with a scroll saw and a pattern, all as and for the purpose set forth.

2d, The auxillary guide plates, h h', links, i i, and suitable accessory plates, k j k, and screws, l, for giving the proper curvature to the plates, h h', all substantially as shown and described, in combination with the guide plate, A' a', and a scroll saw, all as set forth.

82,172.—JOINING AND FITTING HOOF HOOKS.—F. Stanley, Austin, Texas.

I claim the fitting of the hoof-hook or cleaner into the back of the ordinary horse brush, and the mechanism above described, by which it is confined in its sheath or thrown out at pleasure, or any similar arrangement answering the same purpose.

82,173.—COOKING-STOVE VENVILATOR.—C. Stoddard and A. Stoddard, Naples, N.Y.

We claim the sleeve, a, as arranged and combined with stovepipe, A, pipes, B and D, and metallic dish, C, substantially in the manner and for the purpose herein set forth.

82,174.—CHEESE PRESS.—J.D. Stratton and T. Wilson, Mackinaw, Ill., assignors to J. D. Stratton.

We claim a cheese press having attached thereto the cam, H, lever, H, rollers, E and G, and sliding beams, P, constructed and arranged substantially as specified.

82,175.—WASH BOARD.—H. B. Straut, Greenleaf, Minn.

I claim, in combination, the construction of the rubbing board, D, within frame, C, and the mode of attaching the same, thus constructed, to a common washing board, substantially as and for the purposes described.

82,176.—FIRE ESCAPE.—S. A. Swalm and C. C. Smitt, New York city.

We claim, 1st, A fire-escape ladder attached at the upper part of the window, inside the building, in combination with a box or receptacle for holding such ladder when folded, and a swinging bottom and latch, applied substantially as set forth, to cause the ladder to pass outside the building as it is unfolded for use, as specified.

2d, The tubular rungs for the ladder, formed with right-and-left-hand screws at their ends, in combination with the link, n, that connect with the ropes or chains, substantially as set forth.

82,177.—FRUIT GATHERER.—Geo. Tanner, Freetown, N. Y.

I claim, 1st, The combination of the rod, C, with its hook, E, and the rod, A, with its cross-head piece, to form an adjustable clamp for the uses and purposes set forth.

3d, In combination with the above, the saw, F, when arranged to operate as described.

82,178.—COTTON PRESS.—W. H. Tappey, W. C. Lumsden, and A. Steel, Petersburg, Va.

We claim the shaft, G, wheel, P, rack, B, wheel, H, pawls, e and d, double arms, Q, rod, k, lever, M, and roller, f, all arranged, constructed, and operated substantially as described, in combination with the follow block, C, and beam, A, of an upright press, as set forth.

82,179.—BIT STOCK.—J. W. Thompson and F. M. Thompson, Greenfield, Mass.

We claim a bit stock or tool holder, constructed and arranged so as to operate substantially as described.

82,180.—CULTIVATOR.—Thomas Thorley, Southfield, Mich.

I claim, 1st, The quadrant, I, provided with flanges, J, when attached, and operating substantially as and for the purposes herein described.

2d, The levers, K, the bolt and hand nut, L, and the plate, N, provided with the slot, N, when arranged and operating substantially as and for the purposes herein shown.

3d, The combination of the beam, A, the vertical standard, C, the teeth, D and H, the handles, E, and arms, F, the standards, G, the quadrant, I, the flanges, J, the levers, K, the bolt and hand nut, L, the slot, M, and plate, N, when constructed, arranged, and operating substantially as and for the purposes herein set forth, described, and shown.

82,181.—PAPER FASTENER.—William M. Tileston, N.Y. city.

I claim corrugating, fluting, or grooving the points and arms, for punching the holes as described.

82,182.—LUBRICATOR.—Richard H. Tradenick, Pittsburg, Pa.

I claim the oil cup, C, having the column, E, oil passage, G, ball, F, top, K, and set screw, L, when constructed and operating substantially as and for the purpose set forth.

82,183.—SEWING-MACHINE.—J. D. Vanduzer, Tyrone, N.Y.

I claim, 1st, The arrangement of the cam wheel, C, connection, D, lever, E, and pendulous frame, I, when constructed and operating substantially as and for the purpose set forth.

2d, The eccentric, D, bar, N, and pivoted lever, O, in combination, when constructed as described, and arranged to give motion to the cloth, substantially as herein set forth.

82,184.—CUT-OFF VALVE GEAR FOR STEAM ENGINE.—C. W. Wailey, New Orleans, La., assignor to the New Orleans Pneumatic Propelling Company.

I claim, 1st, The arrangement of the toggle joints, D D' D'' D''', with reference to the induction and eduction valves, when those parts are constructed substantially as herein described.

2d, The arrangement of the toggle joints, D D' D'' D''', with the bars, E and E', substantially as herein described.

81,185.—POST HOLE BORER.—Jacob M. Walter, and Samuel Shank, Springfield, Ohio,

We claim, 1st, The arrangement, within the frame, G J K, hinged, at L, to the main frame, of the jointed shaft, f f, bearing the auger, the arm, q, and beveled gear wheel, k, adapted to turn with and move longitudinally on said shaft, pinion, l, on crank shaft, H, windlass, l, cords, p, ratchet wheel, n, pawl, o, and crank, M, all constructed and arranged to operate in the manner and for the purpose herein set forth and shown.

2d, The hollow blocks, C, fixed to frame, A, and adapted to receive the head, b, of axle, a, on which the wheel, B, is held by means of nut, d, as herein shown and described, for the purpose specified.

82,186.—RAIL FENCE.—Eli G. Warner, Union Township, O.

I claim the construction of a fence, with a triangular frame, A B C, in which the rails are laid obliquely, in the manner and for the purpose as above stated.

82,187.—KITCHEN IMPLEMENT.—Charles S. Westland, and John B. Allen, Providence, R. I.

We claim a kitchen implement, constructed substantially as described, and for he purpose set forth.

82,188.—SHOE LACING.—Margeannah White, Providence, R.I.

I claim the eye A, in connection with its fastening, B and C, when constructed and applied to a shoe, substantially as set forth and for the purpose specified.

82,189.—ATTACHMENT FOR PLOW.—Charles E. Wilson, Palmyra, Me.

I claim the spring, B, adjustable roller head, D, and roller, C, as an attachment for a plow, all constructed and operating substantially in the manner and for the purposes shown and described.

82,190.—VALVE GEAR FOR STEAM ENGINE.—Furman R. Wilson, Philadelphia, Pa.

I claim, 1st, The arrangement of the adjustable cams, C' C', composed as described, with reference to the screw thread, b, on the piston rod, l', and the key, e, and key slots, d, substantially as herein shown and described, and for the purpose set forth.

2d, The lever, O O O, with its two short arms, having the rollers, h and i, arranged with reference to the valve rods, M M, and cams, T and S, upon the piston rod, l, substantially as herein described, and for the purpose set forth.

3d, The cams, S and T, being both arranged on one piston rod, in combination with the lever, O O O, substantially as described, and for the purpose forth.

82,191.—CULTIVATOR.—J. A. Woodward, S. S. Woodward, and Thomas Mason, Sandwich, Ill.

We claim, 1st, The reversible axle joints, H H, pivoted to the frame, A B, and arranged to balance the same, substantially as set forth.

2d, The combination of the above-described axle joints, with the frame, A B, and folding seat, L, as and for the purpose herein described.

3d, The handles, D D, pivoted to the standards, E E, and made adjustable to or from each other by means of the slotted plates, F F, and set screws, l l, as described and shown.

82,192.—PERMUTATION LOCK.—Linus Yale, Jr., Shelburne Falls, Mass.

I claim, 1st, The method of adjusting the lock to and connecting it with the door by means of the steady pins and bearing screws, substantially as described, in combination with the fastening screws, or the equivalent fastening, as and for the purpose described.

2d, In combination with the lock bolt, two sets of rotating tumblers, and their appendages, each set operated by one spindle, which also acts upon the bolt and the racks connected with the fence of the tumblers, and capable of being thrown separately in and out of gear with the pinion on the lock bolt, substantially as and for the purpose specified.

3d, The rack, or its equivalent, to stop or liberate the lock bolt, when combined with the fence of the tumblers, by means of an interposed spring, or equivalent, substantially as and for the purpose specified.

4th, Combining the eccentric roller, which is acted upon by a wheel or equivalent on the spindle, with the fence of the tumblers by a vibrating lever, or equivalent therefor, having a spring or equivalent interposed between it and the fence, substantially as described, and for the purpose set forth.

5th, Balancing the tumblers, or, as the equivalent thereof, disconcerting the preponderating weight relatively to the slots for the fence, substantially as and for the purpose specified.

6th, A sliding and rotating spindle, which both shoots the bolt and revolves the tumblers, as described, and is provided with a cylindrical cavity, as specified, in combination with a stationary arbor of greater length than the space occupied by the pack of tumblers, and projecting into the cylindrical cavity of the spindle, the combination being substantially such as hereinbefore set forth.

7th, Combining, with the case which contains the tumblers, and which is fitted to the tubular projection from the lock frame, so that it can be inserted therein and removed therefrom for the purpose of changing the combination, a spring bolt or latch controlled by a separating lock, substantially as and for the purpose described.

8th, Making the knob hollow and threaded on the inside to receive the threaded portion of the spindle to such an extent that it can be fitted to doors of various thicknesses, and then prevented from turning, the one on the other, by a feather key as described.

82,193.—APPARATUS FOR TOLLING GRAIN.—James Armstrong, Bucyrus, Ohio.

I claim the combination of the box, A, with partitions or chutes, e f g, the spout, k, and the gage, l, when constructed and arranged as and for the purpose herein set forth.

82,194.—PROCESS OF REFINING CAST IRON.—Haydn M. Baker, Harlem, N.Y.

I claim the use of solid and fusible insoluble silicates of soda, potash, and other bases, consisting of silicate of lime, magnesia, barytes, strontian, lead, and bismuth, or mixtures of same, for the purpose of removing silica, sulphur, carbon, and metalic oxides from iron at very elevated temperatures, in the manner herein described and for the purposes fully set forth.

82,195.—VAPOR CONDENSER FOR LARD-RENDERING KETTLES.—Wm. M. Bartram, Philadelphia, Pa.

I claim, 1st, The employment of the air tube g, through which air is forced by a bellows, or other equivalent means, into the cap, D, above the fire, in combination with the gooseneck, E, condensers, F and G, and pipe, S, leading into the chimney, whereby a part of the vapor is condensed, and the uncondensed vapor is carried up the chimney, substantially as set forth.

2d, The arrangement of the kettle, C, cap, D, air tube, g, condensers, F and G, pipes, I J N k, conduit pipe, m, discharge pipes, t t' L, and pipe, S, all constructed and operated in the manner and for the purpose set forth.

82,196.—LAMP.—John Bellerjeau, Philadelphia, Pa.

I claim pendent springs, B, terminating in hooks or rests, C, when attached to the lower side of an annular plate, F, having an annular hole, A, in its center, substantially as and for the purpose herein shown and described.

82,197.—WATCH.—P. R. Bennett, Jr., Urbana, Ohio.

I claim suspending the jewel or bush of a watch by means of lateral springs placed about the same, substantially in the manner and for the purpose herein set forth.

82,198.—STEAM GENERATOR.—Auguste L. Bezy and Isidore A. Desnoyers, Paris, France.

We claim, 1st, The arrangement of the inner and outer casings of a steam boiler eccentrically to each other, for the purpose set forth.

2d, A boiler the outer shell of which consists of two or more flanged sections, constructed and so secured together by screw bolts as to be detachable from each other, substantially as herein set forth, for the purpose described.

82,199.—RAILWAY SAFETY ATTACHMENT.—H. S. Blood, Jefferson, La.

I claim the combination of a railroad car with the fender wheels, A A, the shaft, I, and the frame, B, when these parts are constructed, arranged, and operate substantially as herein described, for the purpose set forth.

82,200.—FEATHER RENOVATOR.—Amos Bond (assignor to himself and A. D. Moore), Chicopee, Mass.

I claim, 1st, The combination of the revolving feather holder, A, dryer, C, steam chest, D, tubes, I, valve seat, E, two-way valve, F, valve seat, H, blow-off pipe, G, exhaust valve, G', reservoir, K, and pipe, J, substantially as and for the purpose described.

2d, The removable partition, P, applied to the revolving feather holder, A, to form compartments therein, substantially as described.

3d, The slotted or sawn caps, applied to the outer ends of the tubes, I, when the latter are applied to the steam chest, D, and dryer, C, substantially as and for the purpose set forth.

82,201.—SKATE.—Joseph Bourke, Curraghleagh, Ireland.

I claim the combination of the perforated plate, C, and hooked rod, D', with the movable sole plate, B, lips, b' b', and heel plates, E E2, all arranged to operate substantially as and for the purpose herein described.

82,202.—MANUFACTURE OF ARTIFICIAL STONE.—Wm. K. Boyle, Brookville, Md. Antedated Sept. 7, 1868.

I claim the herein described process of manufacturing artificial stone, by means of which the insoluble silicate of lime is formed, by the doubled decomposition of the silicate of potash and nitrate of lime, substantially as herein set forth and described.

And, as a secondary result, the utilization of the nitrate of potash, as a waste material, in the manufacture of artificial stone, as herein set forth and described.

82,203.—TOP PROP FOR CARRIAGES.—F. A. Bradley (assignor to himself, James G. English, and E. F. Mersick), New Haven, Conn.

I claim, 1st, In combination with a stud, A, of other than cylindrical form, the sleeve, F, formed with the flange, a, and the nut, G, arranged so as to bear against the said flange, substantially as herein set forth.

2d, In combination with the stud, A, formed upon the plate, B, the covering plate, D, with its neck or projection, E, when constructed and arranged so as to cover the plate, B, substantially in the manner herein set forth.

82,204.—PORTABLE PLATFORM SCALE.—H. K. Bugbee, Williamstown, N.J.

I claim, 1st, The levers, G and H, having their fulcra on plates, J, which rest upon adjustable standards, A and A', or directly upon the surface of the ground or floor, in combination with a graduated scale beam, and the within described appliances, or their equivalents, connected therewith, all substantially as and for the purpose set forth.

2d, In combination with the above, the bars, L, or platform, for the purpose specified.

3d, The frame, D, with its fixed and movable arms, h and h', for the purpose specified.

82,205.—HOG CHOLERA MEDICINE.—A. J. Carver and E. P. Horn, Greenhill, Tenn.

We claim the aforesaid medicinal compound for the cure and prevention of hog cholera.

82,206.—GLOBE VALVE.—Wm. Chesley, Cincinnati, Ohio.

I claim, 1st, The bolt, D, screwed into the disk, e, of the seat, B, and drawing said seat in the direction of the pressure of the valve, as and for the purpose specified.

2d, The valve, C, with groove, G, depressions, I I, and lining, L, of brass or any other suitable material, substantially as and for the purpose described.

82,207.—HAND RAKE.—Holley M. Clark, Brewer, Me.

I claim the shafts, A B, wheel, D, tie, C, cross beam, E, and arms, F F F F, in combination with the rotating rake, G d d d, all constructed and operating substantially in the manner and for the purposes shown and described.

82,208.—APPARATUS FOR BREWING MALT LIQUOR.—Paul Conday, Philadelphia, Pa., assignor to himself and Chas. F. Leisen.

I claim an apparatus, so constructed that the steam rising from the brewing boiler during the process of brewing may be used for the purpose of heating and preparing the wort for each succeeding brewing, as described.

82,209.—BUSK OR STAY FOR CORSET.—Thomas B. De Forest, Birmingham, Conn.

I claim a dress or corset busk, of paper or similar fibrous material, having inserted longitudinally therein a metallic spring, substantially as set forth, as a new article of manufacture.

82,210.—RAILROAD CAR HEATER.—W. B. Farwell, New York, assignor to himself and Chas. R. Abbott, Elmira, N.Y.

I claim, 1st, The universal joints, D D, and the pipes, B B and C, applied to the permanent or fixed pipes, A x, of the cars, for the purpose of forming a steam tight connection between the pipes of the cars, and admitting of a free vertical, lateral, and longitudinal play or movement of the latter, substantially as set forth.

2d, The placing of the coiled or sinuous portion of the steam pipes, A x, in inclined positions, with water receptacles, G, communicating with them at their connecting points, said receptacles being provided with valves or siphons, so arranged as to admit of the discharge of the water of condensation at proper intervals, without permitting the escape of steam, substantially as set forth.

82,211.—CUTTER HEAD.—Samuel Fawcett, Rochester, N.Y.

I claim the rotary cutter head, having one or more wings for holding the knives, made adjustable longitudinally, constructed to operate substantially as described.

82,212.—LINIMENT.—Heinrich Fedder, Lancaster, N.Y.

I claim the liniment, made of the ingredients and in the manner substantially as described.

82,213.—DEVICE FOR MEASURING THE FEET OF HORSES.—H. B. Ferren, Batavia, N.Y.

I claim, 1st, In combination with a device, as above described, for taking an accurate measure of the form of a horse's hoof, the arrangement of the index headed screw, E, center screw, a, and point, e, in a straight line, so as to certainly adjust the measure to the center of the foot, as described.

2d, In combination with a device for measuring the hoof of a horse, the slides, G, constructed as described, the index headed bolt, E, and wheel, F arranged and operating as described.

82,214.—DEVICE FOR MEASURING THE FEET OF HORSES.—H. B. Ferren, Batavia, N.Y.

I claim, in combination with the slides, F F, the adjustable slide, C, and the adjustable heel slides, D D, as described, all secured to the one center screw B, as and for the purpose described.

82,215.—DEVICE FOR ATTACHING SHOES TO HORSES' FEET.—Horace B. Ferren, Batavia, N.Y.

I claim, 1st, In combination with a shoe provided with an upward projecting flange at the heel, as shown in the patent to Tyrrell, one or more spring bands, D, fastened by nuts, or their equivalents, to said flanges, substantially as set forth.

2d, The bars, C C, constructed as described, with a screw at the lower end to be inserted in a horse shoe, and a loop, or its equivalent, at the upper end, for the purpose of holding a band, so that the shoe may be attached to a horse's foot by the same, substantially as herein set forth.

82,216.—CHURN DASHER.—Elliot H. Funk, Newark, Ohio.

I claim the pivoted swinging wings, g g, in combination with the break boards, h h, and dash boards, d d, all arranged substantially in the manner and for the purpose set forth.

82,217.—APPARATUS FOR DETACHING HORSES FROM CARRIAGES.—George Gabriel (assignor to himself and Philip Wisenberger) Pittsburg, Pa.

I claim, 1st, The plate, C, having the lock, E, pin, h, and eyes, a a' a'', substantially as described.

2d, The combination of the plate, C, the bars, D and F, constructed and operating substantially as described.

82,218.—BED BOTTOM.—Geo. L. Gerard, New Haven, Conn.

I claim the arrangement of the plate or strip, d, and buttons, f and g, with the spring, C, and slats, A and B, the parts being made and used as and for the purpose specified.

82,219.—LAMP FEEDER.—T. B. Gibbons, Baltimore, Md.

I claim, 1st, The lamp feeder, D, when constructed with the tube, J, extending from the end of the nozzle around to the rear side of the body of the can near its top, and thence through the wall of the can into its interior, and operating substantially as described.

2d, The combination of the cock, N, having the orifice, o, with the nozzle, d3, having the two passages, n n', by which, at the same time that the liquid is delivered from the can, D, to the lamp, A, the gas in the latter is conveyed to the upper part of the can, without escaping around the nozzle, and in the manner described.

82,220.—BRAKE FOR YARN BEAM OF LOOMS.—Joseph John Harrison and Edward Harrison, Broughton, England.

I claim, 1st, The chains or bands, f, bearing on the ends of the warp roller, and secured to a bar, m, in combination with the within-described devices, or their equivalents, for adjusting the bar and securing it after adjustment, for the purpose specified.

2d, The combination of the above and the springs, l, connected to the bands or chains, f, for the purpose described.

82,221.—STEP LADDER JOINT.—Shubael E. Hewes, Albany, N.Y.

I claim the joint, composed of the foot, c c, the round, s, the button, B B and the matrix, a a, substantially in the manner and for the purpose above described.

82,222.—LOW WATER INDICATOR.—George M. Hopkins, Albion, N.Y.

I claim, 1st, The vessel, A, in combination with the pipes, B B and C C, and the swivel joints, D D and E F, operating in the manner substantially as shown and described.

2d, The stop cocks, I and O, having the spring catches, L L, in combination with the vessel, A, arranged to operate substantially as shown and described.

3d, The vessel, A, in combination with the whistle, P, and intermediate devices for giving alarm and regulating the supply of water, as above set forth.

82,223.—GANG PLOW.—Charles L. Horn, Jr., and Leonard Mancy, St. Morgan, Ill., assignors to Leonard Mancy.

I claim, 1st, The frame, A A1 A2, the wheels, B and B1, adjustable arm, b b1, post, B2 and braces, B3, when combined and arranged as herein shown and described.

2d, The plow beams, C, their posts, C1, and the frame beam, A2, when constructed substantially as herein shown and described, and for the purpose set forth.

3d, The beams, C, post, D, and seat, D', when constructed and arranged as herein shown and described.

4th, The arrangement of the beams, C, rod, E, and lever, E', in the manner and for the purpose herein described and set forth.

82,224.—DEVICE FOR FILLING MARSHES.—George Howell and William Smith, Philadelphia, Pa., assignors to George Howell.

We claim, 1st, The combination and arrangement of the case, B, constructed as described, with the scow, A, substantially in the manner hereinbefore described and for the purpose set forth.

2d, The combination of the perforated pipes, J, with the case, B, substantially as for the purpose above described.

82,225.—WATER WHEEL.—John Hoyt, Hughsonville, N.Y.

I claim an outward discharge water wheel, constructed as described, namely, having a top plate, B, inverted cone, F, buckets, d d, and rim, D, all constructed and arranged in relation to each other, substantially as herein described.

82,226.—RAILWAY SNOW PLOW.—Jenkins Jones, and T. G. Eiswald, Providence, R.I.

We claim the arrangement of the frame, A, constructed as above described, with the apron, G, and the deflector, E, substantially as herein set forth.

82,227.—BELT FASTENING.—Timothy Kennedy, Mount Carmel, Conn.

I claim the springs, D D, provided with bosses, a a, and fitting transversely against the under side of the belts, in line with the perforated edges of the single top plate, A, the bosses, a a, being adapted to receive the ends of the screws passing through the top plate and belts, as herein described for the purpose specified.

82,228.—ILLUMINATING DAMPER.—John H. Keyser, New York city.

I claim, 1st, The door, A, constructed with openings, h, and mica holding ribs, g g', substantially as described.

2d, The mica holding plate, D, interposed between door, A, and plate, B, substantially as described.

3d, Providing an illuminated door or window for a stove with fixed mica lights d, and movable mica lights, d', substantially as described and shown.

82,229.—GATE.—John H. King, Smithfield, Ind.

I claim, 1st, The combination and arrangement of the pins, d1 d2, plates, d, sliding bolt, E, concealed spring, F, and weighted lever, G, when constructed and operating as described.

2d, The combination of pins, d1 d2, plates, d, sliding bolt, E, concealed spring, F, weighted lever, G, hinged prop, H, and catch, g, arranged and operating as described.

82,230.—BOTTLE STOPPER.—John Klee, Dayton, Ohio.

I claim the stopper or plug, B, made conical or tapering at both ends, and provided at one end with the rubber packing disk, A, arranged as described, and secured by a tack, F, all as and for the purpose herein set forth.

82,231.—ATTACHMENT FOR GAS BURNERS.—Julius Kopp, Hoboken, N.J.

I claim an adjustable cap, A, constructed of woven or perforated metals, with flanges, A'' A'' A'', substantially as and for the purpose set forth as an article of manufacture.

82,232.—FAUCET.—B. F. Kraft, Reading, Pa.

I claim the combination and arrangement of the induction passage, a, valve, b, spring, d, handle, D, three cornered piece, E, and eduction-passage, i, the whole being constructed and operated as set forth.

82,233.—WHIFFLE TREE SWIVEL.—M. F. Lanning, White House, N.J.

I claim the movable swivel, D, constructed as described, with one end longer than the other, and pivoted to the end of the iron, B, for the purpose of attaching trace to a whiffle tree, substantially as herein set forth.

82,234.—TREE BOX.—J. W. L. Letherbury, Sandoval, Ill.

I claim a tree wrapper constructed and operating substantially as described.

82,235.—CHURN.—Henry Leber, Bellfair Mills, Va.

I claim the herein described triangular form of paddles, arranged in alternate ranks, in opposite position, as relates to their angles upon the shaft, as herein shown and described.

82,236.—CARPET LINING.—Miles Mayall, Roxbury, Mass., assignor, by mesne assignment, to George W. Mayall. Antedated June 27th, 1868.

I claim, as an article of manufacture, an under lining for a carpet, constructed from an elatic fibrous material, placed between the surfaces, one of paper and the other of a thin, open-woven fabric, and having perforations through the whole, substantially as described.

82,237.—MACHINE FOR BENDING WOOD.—Josiah F. Melcher, Bloomington, Ill.

I claim the construction and arrangement of he cross beam, C, tables, F F' and frame, D D', substantially as shown and described.

82,238.—PROCESS OF DEBRANNING WHEAT.—John G. Moxey (assignor to himself, Henry C. Carey, and Abraham Hart), Philadelphia, Pa.

I claim the within described improved process of debranning wheat, that is to say, subjecting the grain, without the use of steam, and while in a dry state, to the action of the blades, in the manner described.

82,239.—DROP TUBE STEAM GENERATOR.—Joseph Nason, New York city, assignor to himself, Charles H. James, and Frank Milward, Cincinnati, Ohio.

I claim, 1st, The within described extension of the drop tube upward above

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the upper surface of the tube sheet, A, and the provision for allowing a current of water to enter through the side of such extension, and descend through an inclosed passage or tube, d, combined and arranged substantially as and for the purpose herein set forth

2d, In combination with the above, making the ex ended top, D', in a separate piece from the main cup tube, D, and adapted to serve, relatively to the other parts, substantially in the manner and for the purpose herein specified.

82 240. SAW SHARPENING DEVICE.—A. M. Newman, Terre Haute, Ind.

I claim, 1st, The adjustable standards, B B, provided with heads, C C, and washers, e e, for the purpose of securing the files, and adapting the machine to different sized files, substantially as and for the purposes herein set forth.

2d, The combination of the slotted bar, A, standards, B B, handles, D D, rod d, guides, i i, constructed and operating substantially as and for the purposes herein set forth.

82,241 —FOUR-WHEEL PLOW.—Nelson B. Norton, Burlington, Wis

I claim, 1st, The arrangement of the lever, H, jaws, I, and metallic straps, K, with the plow beam, F, frame, C, post or standard, L, straps, M, and catch h, when constructed and used as and for the purpose set forth,

2d, The adjustable rod, g, in combination with the frame, C, and plow beam, F when arranged as and for the purpose specified.

82 242 —LIME KILN.—W. C. Pettijohn, St. Louis, Mo.

I claim the arrangement of the kiln, A, having the chamber, A', grate, a, ash pit, B, side aperture, a', metallic dome, D, constructed in two parts, and having the smoke exit, a2, all combined substantially as herein set forth.

82,243 —MACHINE FOR FORMING BUTTONS—S. G. Pitts (assignor to himself and W. L. Palmer), Leominster, Mass.

I claim the combination of, as well as the arrangement of, one or two sets of mandrels, A B, the toothed rack or carrier, L, and its supporting rail, K, and the clamp, M M, the whole being provided with mechanism for operating the rack, mandrels, and clamps, substantially as described.

82 244.—APPARATUS FOR CARBURETING AIR.—J. T. Plass and R. H. Plass, New York city.

We claim, 1st, The gate, E, in combination with the fluid trap, c2, constructed as described, for regulating the supply of hydrocarbon to the evaporating chamber, and returning the surplus to the reserve chamber, substantially as set forth.

2d The tubular stem of the hollow cone valve, G, for the insertion of shot or other suitable weights, for adjusting the pressure in the gasometer, substantially as set forth.

82 245 —BLIND HINGE.—R. B. Prindle Norwich, N. Y.

I claim a self locking blind hinge, formed by combining the pin, G, with its conical base, and a corresponding seat in the disk, F, with the shoulder, H, engaging the leaf, D, in the manner and for the purpose substantially as herein shown and described.

82,246.—ANIMAL TRAP.—H. W. Prouty (assignor to himself and Howard Tilden), Boston, Mass.

I claim the arrangement of the arms, D D, spears, K K, bait rod, L, and bait cup C, in combination with the spring F, and catch, G, the whole being constructed and arranged upon a block or frame, substantially as described and for the purpose set forth.

82.247.—TABLE.—J. C. Putnam, Worcester, Mass.

I claim, 1st, The construction of the top, B, the pieces, C C, for supporting the top, in connection with the slide, R, substantially as set forth and described.

2d, The combination of the movable legs, leaves, drawer or drawers, and a fastening mechanism that holds both drawer and leaves, substantially as set forth and described.

82,248 —BRICK KILN —S. D Rader, Williamsport, Pa.

I claim the arrangement of the kiln, A, end furnaces, C, and long side furnaces, B, composed of a series of small fireplaces, o o o, and provided with draft holes, I I, at the side and ends, all constructed substantially as and for the purposes herein set forth

82,249.—GAS BURNING FURNACE FOR STEAM GENERATORS.—John T. Rich, Philadelphia, Pa. Antedated July 8, 1868.

I claim, 1st, So arranging a furnace that the coal shall be subjected to distillation before it enters the fire box, and at the same time so arranging the draft or blast that the gases thus evolved shall be thoroughly mingled with atmospheric air or air and steam within the furnace, but before entering the fire box or combustion chamber to be consumed, substantially as described.

2d, The chute, C, extending in the form of a tube into the fire chamber and serving as a retort, for the purpose of distilling the coal retained in the tube by means of the heat of the fire box, in combination with a draft pipe, F F', substantially as set forth.

3d, The steam blast, , so arranged in relation to the tube or retort in which the coal is subjected to distillation, that the wet steam and atmospheric air shall be mingled with the gaseous products of the coal before entering the fire box, substantially as set forth.

4th, The arches or diaphragms, G, when constructed of a refractory substance, and extending entirely across the fire-box, and perforated with openings, K, substantially as and for the purpose set forth.

5th, Double perforated arches or diaphragms, G, in combination with intermediate openings, P, through the external walls

6th, The combination of the chute, C, extending into the fire-box, to act as a retort in the distillation of the coals and arches or diaphragms, G, so located within the fire-box as to reflect the heat upon such retort, substantially as set forth.

7th, The steam blower, constructed with concentric funnels, N, extending successively from the center, one beyond the other, and discharging the currents passing between them into a tubular extension, F', of the outer case, F, substantially as set forth.

82,250 —COMBINED CORN SHELLER AND APPLE GRINDER.—M. H Ripley and William N. Temple, Minneapolis, Minn.

We claim the combination of the tapering and concaved-toothed cylinder, B, guide, F, springs, G, gears, D E, and frame, A, with its spouts, I J, when the several parts are constructed and arranged in the manner specified.

82,251.—BIT STOCK.—Clemens B. Rose Sunderland, Mass.

I claim the handle, A, constructed of the two pieces applied to the stock, B, as described, and secured by the ferrules, C, all substantially as herein set forth.

82,252 —MACHINE FOR THREADING BOLTS.—J. Schuessler, and John Kennedy, La Fayette, Ind., assignor to John Schuessler.

We claim, 1st, the arrangement, herein described of the hollow slotted mandrel, B, the grooved reciprocating head, E, and the cutters, C.

2d, The combination of the devices set forth in the foregoing clause, with the lever, F and graduated quadrant, M, substantially as set forth

81,253 —HARVESTER.—Thomson C. Sebring, Milford, Mich.

I claim, 1st, The employment in grass and grain harvesters, of a round cast-iron main frame, F, constructed substantially in the manner and for the purposes herein shown and described.

2d, In combination with the main frame F, the cover or cap, C, substantially as shown and described, for the purpose of entirely encasing the gearing of the machine, and protecting it from dust and dirt.

3d, In combination with the horizontal bevel wheel, W, the box or step, s, and adjusting screw, v.

4th, The annular pawl, p, provided with the inclined plane e, arranged and operating substantially in the manner and for the purposes herein shown and described.

5th, The arrangement of the spring, f, as shown, and operating in the manner and for the purposes described.

6th, The hand lever, Y, pivoted to the head H, of the cutter bar, and operating substantially in the manner and for the purposes herein shown and described.

7th, Pivoting the rear end, h", of the cutter bar head, H, in the shoe, S, with a spherical joint to permit any necessary vertical change in the elevation of the outer end of the cutter bar, and also of the front side, substantially in the manner and forth purposes herein shown and described.

8th, The adjustable gate, a", secured to the standard, J", of the shoe, S arranged to operate as herein described.

82,254.—COMPOSITION FOR STUFFING AND FILLING WOOD.—Jacob Sheller, Wilmington, Del.

I claim the combination of the within named ingredients, when mixed in the several quantities and proportions, as herein described and for the purpose set forth.

82,255—FILTER.—Thomas Simmons, Brooklyn, N. Y.

I claim, 1st, The case, A, provided with a movable head, and each of its heads being provided with the pieces, D D, upon which screw threads are formed, so that the filter can be reversed and cleansed, substantially as set forth.

2d, The frame, C, as constructed and combined with the case, A, and pipes D D and G, when used with a force pump as and for the purpose set forth.

82,256.—COMBINED CLOTHES-HORSE, ETC.—Henry L. Stillson, Plattsburg, N. Y.

I claim 1st, The four armed rollers D D, constructed as described, with a series of holes through one of the arms, and provided with ratchet wheels, E, and journals, n n, which revolve between the side pieces, A A, substantially as and for the purposes herein set forth.

2d, The combination of the grooved supports, A A, with the top, B, and board, G, and rails, F, when they are adjustable, and all constructed as and for the purposes herein set forth.

82,257.—SAWING MACHINE.—Hiram Thompson (assignor to R. Hall & Co.), Worcester, Mass.

I claim, 1st, The combination and arrangement, with the saw-arbors, E E, or either, and the stationary disks K K, of the movable disks, F F, substantially as and for the purposes set forth.

2d, The arrangement of the binding pulley, U, in relation to the belt, N, pulley O, and saw arbors, E E, substantially as and for the purposes set forth.

82,258.—REVOLVING FIRE-ARM.—F. Alexander Thuer, East Hartford, assignor to Colt's Fire-arms Manufacturing Company, Hartford, Conn.

I claim, 1st, The laterally movable piece, g, containing the firing pin, i, in combination with the rotating-chambered breech and the hammer of a revolver, substantially as described, and for a safety device.

2d, A laterally movable plate, located between the hammer and cylinder of a revolver, and bearing the shell ejector, substantially as and for the purpose hereinbefore set forth.

3d, The combination of a movable piece, supporting both the firing-pin and an ejector, with the hammer of a revolver, and with a rotating breech, having chambers open at the rear, when arranged to permit the direct will of the hammer either as a means of igniting the charges or of expelling the empty shells from the chambers, substantially as hereinbefore specified.

82,259.—CLOTHES WRINGER.—Josiah Webb, Spartansburg, Pa.

I claim constructing the rolls, B B', of the wooden cylinder, D, the coating of pitch and sand, m, and the spirally wound coil of rubber, o, arranged in the manner and for the purposes specified.

82,260.—MANUFACTURE OF ARTIFICIAL STONE.—Demetry Mindeleff, Washington, D. C.

I claim the herein described improvement in artificial stone.

82 261.—CIDER MILL.—Charles Wilson, Clinton, Pa. Antedated September 4 1868.

I claim the combination and arrangement of the endless roller belt, C, hopper, A, revolving bottom, D, and circular upright frame, G, when constructed, arranged, commuted, and operated as herein described, and for the purposes set forth

82,262.—VAPOR BURNER.—Christoph Wintergerst, Mobile, Ala.

I claim the arrangement of the reservoir, A, curved tube, B, burner, C, screws, G G, ring, E, and plate, D, whereby a light is produced and so divided but a larger and brighter flame is formed, all as herein specified.

82,263.—STILL FOR TURPENTINE.—J. E. Winants, Brooklyn, N. Y., and John F. Griffin, New York city.

We claim, 1st, The process, substantially as described, of distilling the crude material and extracting the fumes at a low temperature, and carrying them off from the lower portion of the still, as and for the purposes set forth.

2d, The employment, in combination with the chamber or case of the still, of a steam heated rotating agitator cylinder, into and through which the crude material passes during the process of distillation, substantially as described.

3d, The employment, in combination with the melting chamber, of one or more heated barrel supporters, F, adapted to hold and melt out the contents of the barrels, substantially as hereinbefore described.

4th, The employment of steam rubs so perforated as to eject the live steam on to those surfaces which are required to radiate the greatest quantity of heat, substantially as herein set forth.

8 264.—WATER ELEVATOR.—C. P. Woodruff, Newbern, Tenn.

I claim, 1st, The cylinder, C, constructed with the central partition or wall, C', when employed in combination with the sliding shaft, F, and the tubular bearings, e e, substantially as described.

2d, The arrangement of the spring, s, tubular bearings, e e, shaft, F, clutch, m, partition, C', and cylinder, substantially as described and shown.

82.265. SAWING MACHINE.—Oscar E. Moore, Corunna, Mich., administrator of the estate of Samuel Yarion, deceased.

I claim the guides, b, affixed to or forming part of a wheel, R, or its equivalent, in combination with a saw shaft, P, operating substantially as described, for the purpose specified,

82 266.—CLOCK.—John B. Mayer, Niagara Falls, N. Y.

I claim, 1st, The arrangement of the wheel, A, pinion, E, escapement wheel, D, with the hour, minute, and second hands upon axis of said escapement wheel, substantially as herein described.

2d, In combination therewith, the ratchet wheels, k l, revolving tooth, l', pin, i, and wheel G, operating substantially as and for the purpose described.

82,267.—STRIKING MECHANISM FOR CLOCKS.—John B Mayer, Niagara Falls, assignor to himself and Tobias Witmer, Williamsville N.Y.

I claim, 1st, The spur wheel, D, in combination with the pins, v v v, and the pinion, F', the tumbler wheel, E, the spur wheel, F, the pinion and fly wheel, G, in combination with the hammer tails, o1 p1, in order to effect the striking of quarters and hours on separate bells, as set forth.

2d, The combination of locking plates, B and C, and locking wheel, A, for controlling the action of the hour and quarter hour hammers on two or more separate bells.

3d, The combination and arrangement of the sliding shafts, O and P, lever, q, hammer tails, o1 and p1, springs, o2 and p2, and pin wheel, D, for the purpose substantially as herein described.

4th, The lever, R, in combination with the locking plate, C, and sliding hammer shaft, P, for the purpose of shifting the said hammer shaft, and alternating the action of the hammers on the bells.

REISSUES.

79,298.—MANUFACTURING GLASSWARE WITH HANDLES.—Dated June 30, 1868; reissue 3,116.—J. S. Atterbury and T. B. Atterbury, Pittsburgh, Pa

We claim, 1st, Producing handles for glass lamps and other glassware by casting them in molds ready to be attached to such articles, substantially as described.

2d, The manner, substantially as described, of attaching glass handles to lamps or other articles of glass, in the process of blowing such articles in a mold, substantially as described.

3d, Guiding hot flexible glass, as it drops or descends from the "punty" or pipe of the operator, to the point of attachment on the bowl or other article, by means of a mold which shapes the handle.

4th, Dropping hot flexible glass into a mold for the purpose of forming a handle or handles for the bowl of a lamp or other vessel.

5th, A glass lamp or other article in glass having a molded or cast handle and a blown body, produced substantially as described.

51,991 —BREECH-LOADER.—Dated January 9, 1866; reissue, 3,117.—Berdan Fire-Arms Manufacturing Company, New York city, assignees of Hiram Berdan.

We claim, 1st, The employment, in a breech-loading fire-arm, of a device, so applied and operated as to press back the cartridge against the face of the breech preparatory to firing, substantially as and for the purpose herein described.

2d, So applying and operating the cartridge shell refractor of a breech-loading fire-arm, that it shall serve the purpose of pressing back the cartridge against the face of the breech preparatory to firing, substantially as herein specified.

3d, So arranging the detonating pin of a breech-loading fire-arm, that it shall strike the back of the head of the cartridge opposite to where it is supported by a movable device, which serves the purpose of pressing back the cartridge against the breech, substantially as herein set forth.

4th, The elongation of the hole provided in the swinging breech, for the reception of the pin upon which it swings, whereby the breech has a direct support in the breech receiver at the time of firing, and yet is free to swing back loosely, to open the barrel for reloading, substantially as herein set forth.

5th, The relative position and arrangement to each other of the hammer, firing-pin, swinging breech, and line of bore, by which the line of bore is unobstructed and the loading facilitated when the hammer is at half cock, substantially as herein described.

6th, The combination, with one main spring, of two or more stirrups, one or more connecting the tumbler or hammer, and the other connecting a brace, for locking the breech when the hammer is down substantially as herein set forth.

7th, In combination with a swinging breech piece, the employment of a suitable projection on the lower or front side of the brace or tumbler, whereby the loading at full cock is prevented, substantially as and for the purpose herein specified.

8th, So constructing and applying a brace to a swinging breech, for breech loading fire-arms, that it swings on a tumbler shaft detached from the tumbler, but is attached to the main spring in such a way as to give a greater motion to the brace than is given to the tumbler.

9th, So combining a movable brace, which operates to lock the breech at the time of firing, a three-notched tumbler, and a swinging breech, in a breech loading fire-arm, that while the hammer is locked by the sere in the first or safety notch, the breech is locked in a closed condition by the said brace, substantially as herein set forth.

10th, The combination of the flanged breech receiver or lock frame, A, the pins upon which the hammer, breech, and sere work, and the cheek pieces of the stock, by which the pins are held in place, substantially as herein described and for the purpose herein set forth.

51.991.—BREECH-LOADER.—Dated Jan. 9, 1866; reissue 3,118.—Division B.—Berdan Fire-Arms Manufacturing Company, New York city, assignees of Hiram Berdan.

We claim the recess, a, provided in the hub or hinged portion of the breech piece, in such relation to the barrel or chamber as is herein described, for the purpose set forth.

78,932 —PRESERVING MEATS, FRUIT, ETC.—Dated June 16, 1868; reissue 3,119.—Wm. Davis, Samuel H. Davis, and David W. Davis, Detroit, Mich, assignees of Wm. Davis.

We claim, 1st, The construction of a car body, ship's hold, room box, or chest provided with compartments, A B C, ice receptacle, D, chimney, E, and hatches, G, when arranged and operating substantially as described for the purposes set forth.

2d, The goose neck trap, F, or equivalent, in combination with receptacle, D, and compartments, A B C, when arranged substantially as and for the purposes set forth.

3d, The receptacle, D, for the freezing mixture, so constructed and arranged as to be pendent from the inner upper wall of chamber, C, and allowing a free circulation underneath the receptacle and on all sides, substantially as described.

4th, The construction and relative arrangement of the ice receptacle, D, with the chamber, C, whereby the moisture in said chamber, C, is frozen to the wall of receptacle, D, substantially in the manner and by the means described.

62 683.—ALARM LOCK.—Dated March 5, 1867; reissue 3,120. James S. Porter and Russel Porter, Waterford, N. Y.

We claim, 1st, The cam or stop, P, which, by being properly set, offers an obstruction to the turning of the key, substantially as described.

2, The pistol, C, hammer, G, latch, H, and trigger, L, when all arranged and combined within the interior of a lock casing, provided with a cover, o, and plug, F, substantially in the manner and for the purpose described

78,132.—PLANER CHUCK.—Dated May 19, 1868; reissue 3,121 Charles H. Riggs, Windsor Locks, Conn.

I claim, 1st, In combination with the movable jaw, B, and slotted chuck bed, b, the eccentric shaft, D, with eye bolts, E E, and nuts, G G, arranged towards the front of the jaw, the jaw being constructed with a back surface equally as high as the front, or surface next to the stock, substantially as herein shown, and for the purpose set forth.

2d, The device for fastening the chuck to the base plate, M, consisting of the plate, K, with annular groove, bed plate, L, angle irons, O, threaded pin, B, with nut, and groove, Q, in base plate, M, all constructed and arranged in the manner described.

3d, The arrangement of the round or dove-tailed nuts, R R, screws, J J, stationary jaw, C, and the movable jaw, B, substantially as shown and set forth.

79,865.—GRINDING PLATE FOR GRIST MILLS.—Dated July 14, 1868; reissue 3 12 .—Henry Shaw and Wm. D Leavitt, New Orleans, La.

We claim the combination and arrangement of the cast iron grinding plate B, the unyielding non-conducting paper packing, C, and back plate, D, all constructed and secured together substantially in the manner and for the purpose herein described.

78,404. —RAILWAY RAIL AND SPLICE.—Dated May 26, 1868; reissue 3,123.—Zalmon B. Wakeman, Rockford, Ill.

I claim, 1st, The hollow shell rail, A, when the sides are curved in toward each other so as to receive and retain the block, B, as and for the purposes set forth.

2d, The combination of the hollow rails, A, with the connecting block, B, provided with a removable bar or key, b, substantially as herein set forth and shown.

46,771.—APPARATUS FOR CARBURETING AIR OR GASES.—Dated March 14, 1865; reissue 3,124.—John A. Bassett, Salem, Mass.

I claim, 1st, The general arrangement and construction of the apparatus consisting of the several parts shown and described.,

2d, The carburation of air or gases by the use of perforated plates or cylinders, with the fibrous material partially immersed in the hydrocarbon liquid, substantially in the manner as set forth and shown.

3d, The automatic regulation of the air to be admitted to the holder and carbureter, by means of a valve connected with and operated by the holder, through the lever and cord, or their equivalents, when used for this purpose, as shown and specified

4th, A carbureting device placed in the gas-holder tank, in the manner substantially as described.

5th, A carbureting device for enriching air or gases with the vapor of a volatile hydrocarbon, placed in a gas-holder tank, having a seal for the holder independent of the level of the hydrocarbon liquid.

6th, The combination of a device for carbureting air or gases, using capillary materials, with the method of carbureting by forcing the air or gases through the hydrocarbon.

7th, The automatic reservoir for replenishing the hydrocarbon liquid in the carbureting chamber, in combination with a gasometer, substantially as shown and described.

8th, The use of a mercury valve for controlling the admission of air to the carbureting chamber, as set forth and shown.

9th, Forcing air or gas through hydrocarbon liquid, or through capillary materials charged with such liquid, within a gas holder, so as to carburet or enrich the same, substantially as described.

10th, The combination of a gas holder, a vessel to contain hydrocarbon liquid within the gas holder, and an air or gas forcing apparatus, substantially as described

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,493.—MANUFACTURE AND FASTENING OF PAPER BAGS.—Joseph Rapson, New Bedford, Mass. Aug 10, 1868.

2,494.—MACHINE FOR MAKING EYELETS.—James M. Osgood, Somerville, Mass Aug. 10, 1868.

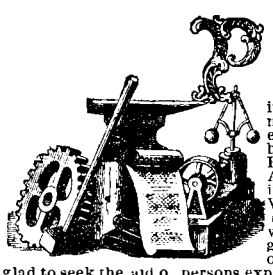
2,497.—AUTOMATIC INDICATOR FOR STEAM BOILERS.—Edwin L. Bomeisler, Philadelphia, Pa. Aug. 10, 1868.

2,528.—PHOTOGRAPHIC FRAMES, AND MECHANISM FOR MAKING THE SAME.—Garret P. Bergen and Chas. T. Bainbridge, New York city. Aug. 12, 1868.

2,534.—BREECH-LOADING FIRE ARMS AND CARTRIDGES.—Isaac M. Milbank, Greenfield Hill Conn. Aug. 13, 1868

2,564.—FOG ALARM.—John R. Anderson, Brooklyn, N. Y. Aug. 17, 868.

PATENTS



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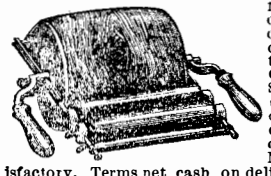

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.
Jarvis Case, of Lafayette, Ind., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, reissued on the 16th day of November, 1858, and again reissued on the 17th day of April, 1866, for an improvement in "Seed Planters," it is ordered that said petition be heard at this office on the 21st day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
14 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 11, 1868.
George W. Hubbard and William E. Conant, of New York city, having petitioned for an extension of the patent granted them on the 9th day of January, 1855, and reissued on the 18th day of September, 1866, for an improvement in "Operating Slide Valves in Direct Action Engines," it is ordered that said petition be heard at this office on the 21st day of December, next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
14 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 7, 1868.
R. F. Brown, Dorchester, Mass., having petitioned for an extension of the patent granted him on the 12th day of December 1854, for an improvement in "Hanging Carriage Bodies."
It is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.
Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted him on the 12th day of December, 1854, for an improvement in "Rattan Machine," it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.
13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.
Washington, D. C., Sept. 9th, 1868.
James E. Simpson, of Brooklyn, N. Y., having petitioned for an extension of a patent granted him on the 5th day of December, 1854, for an improvement in "Dry Docks," it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept. 9, 1868.
Charles Danforth, of Paterson, N. J., having petitioned for the extension of a patent granted him on the 12th day of December, 1854, for an improvement in "Throstles for Spinning Cotton," it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
13 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., August 27, 1868.
Emeline M. Woodruff, late Emeline M. Stedman, of Elizabeth, N. J., executrix of the estate of Geo. W. Stedman, deceased, having petitioned for an extension of the patent granted to said Geo. W. Stedman the 12th day of December, 1854, and reissued the 26th day of April, 1859, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 2, 1868.
Birdsill Holly, of Lockport, N. Y., having petitioned for an extension of the patent granted to him on the 6th day of February, 1855, for an improvement in "Elliptical Rotary Pumps," it is ordered that said petition be heard at this office on the 11th day of January next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug 28, 1868.
Aaron H. Allen, of Boston Mass., having petitioned for an extension of the patent granted to him on the 5th day of December, 18—, for an improvement in "Seats for Public Buildings," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., August 31, 1868.
Jeremiah Stever, Bristol Conn., having petitioned for an extension of the patent granted him on the 12th day of December, 1854 for an improvement in "Machines for Scraping Metals," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Aug 28, 1868.
John Pepper, of Gilford, N. H., having petitioned for an extension of the patent granted to him on the 5th day of December, 1854, and reissued on the 27th day of October, 1868, for an improvement in "Circular Knitting Machines," it is ordered that said petition be heard at this office on the 23d day of November next. Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE
Washington, D. C., Sept 4th, 1868.
Samuel N. Miller, of Dedham, Mass., having petitioned for the extension of the patent granted him on the 29th day of June, 1852, for an improvement in "Combined Anchor," this application having been authorized by Act of Congress, approved July 20, 1868, it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.
Washington, D. C., Sept. 1st, 1868.
Cyrenus Wheeler, Jr., of Auburn, N. Y., having petitioned for the extension of a patent granted him on the 5th day of December, 1854; reissued Jan. 3, 1860, in seven divisions, numbered 875, 876, 877, 878, 879, 880, 881, and reissue numbered 876, again reissued May 14, 1867, and numbered 2,610, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
12 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.
Washington, D. C., Sept. 1st, 1868.
Cyrenus Wheeler, Jr., of Auburn, N. Y., having petitioned for the extension of a patent granted him the 6th day of Feb 1855; reissued June 5, 1860, numbered 971, and again reissued May 28, 1867, and numbered 2,632, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 23d day of November next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
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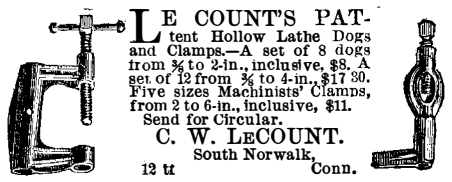

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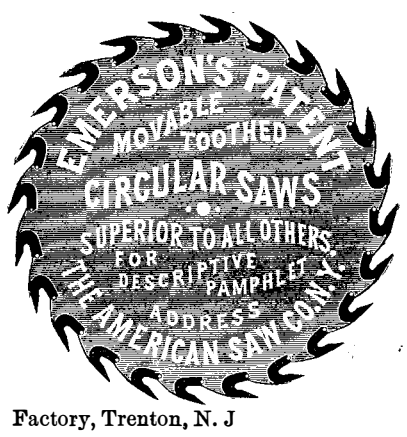

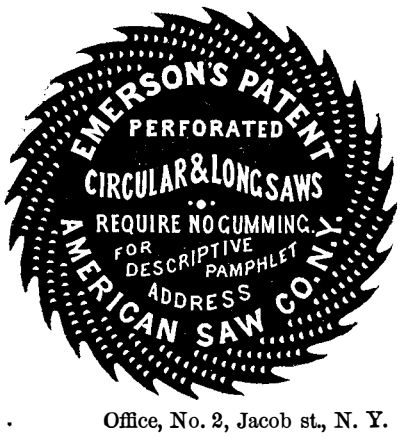

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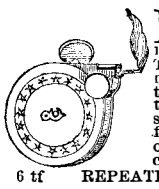

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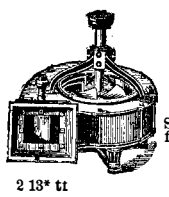

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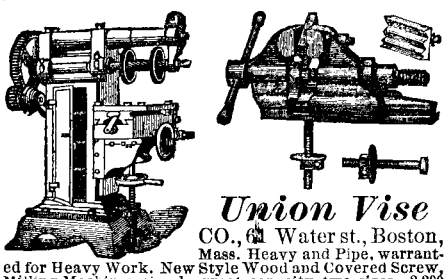

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